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## INCLUDING A MEDICAL MISCELLANY

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# WASHINGTON MEDICAL ANNALS

## CASE OF INFLUENZA MENINGITIS.*

By JAMES STUART, M. D.,

Washington, D. C.

The fact that Pfeiffer's influenza bacillus in pure culture was found on withdrawing, during life, some cerebro-spinal fluid by lumbar puncture, makes this case of cerebro-spinal meningitis highly interesting. Less than twenty cases have been so reported, and less than twenty-five showed pure culture, including those gotten from meningeal exudate after death. Pfeiffer first described his bacillus in 1892, and Testevin in 1897 demonstrated that influenza bacilli could themselves produce the disease. The mortality of this form of cerebro-spinal meningitis is simply frightful, only three cases having recovered from twenty-three known and verified cases. Children have almost invariably been the victims, only two adults, from whom pure cultures were obtained, having been attacked. Clinically the diagnosis has from time to time been made, but we are dealing now with pure culture cases.

My case, M. S. J., colored female, one year and nine months of age on the day of her death, December 7, 1907, had had an attack of whooping cough during the previous September, continuing over into October; on the 15th of which month she was practically well of the pertussis, although her cough had not entirely disappeared. November 22, she was taken suddenly ill with high fever and some delirium. This fever was continuous so far as her parents could tell. November 25, the fourth day of the disease, I first saw the child, and found her with a rectal temperature of 103.5; pulse 160. She had slight rigidity and tender-

* Read before the Medical Society, December 11, 1907.

ness of the muscles of the back of the neck; was apparently deaf, not paying any attention to questions.

Her mother said that the child had not spoken since the day of onset. She had moist râles in both lungs, more in the right. Her pupils were normal, reacting to light. A diagnosis of probable cerebro-spinal meningitis was made at once, and the mother so informed. The next day the temperature was 103 and pulse 160. The neck symptoms were more pronounced, with some retraction of the head. The child was very irritable, objecting to being handled, and whining when moved. November 28, the seventh day of the disease, the temperature was 103, pulse 160. She was somewhat restless in her movements, trying to turn over. She made a peculiar sucking noise with her tongue and mouth. Retraction of the head was more pronounced and more pain on pressure was present. November 30, the ninth day, the temperature was 104, and pulse 170; the bowels were a little loose. The patient was very irritable and whining. So far she had not spoken a word. December 2, the eleventh day, the temperature was 104.5, and pulse 165.

Dr. W. W. Wilkinson made a lumbar puncture, withdrawing some turbid fluid in which he found the Pfeiffer bacillus and from which he grew pure culture. That night she passed a very restless night, whining a great deal. The bowels kept loose. December 3, the twelfth day, the temperature and pulse were about the same, and the child rolled her head from side to side. The patella, ankle and plantar reflexes were exaggerated.

December 4, the thirteenth day, she was apparently better, but her temperature was 104.5 and pulse 160; the bowels were still loose, and she had some nystagmus. She ate bread in milk and broth, having taken only liquids previous to this. She was very fretful on handling. Kernig's sign was elicited, and the patella, ankle clonus and plantar reflexes were greatly exaggerated.

December 5, temperature 104, pulse 160. Passed a lumbricoid worm. Both elbows swollen with acute synovitis. Takes soft bread and milk. Pays no attention to persons, but still opens mouth for food. Was taken suddenly worse through the night, having convulsive movements, and when I saw her the next day, December 6, her temperature was 105.2 and her pulse was 190 to 200. Breathing 90 per minute, and Cheyne-Stokes in character. All reflexes more exaggerated. Tickling the sole of foot caused

twitching of the muscles of leg and thigh. Kernig's sign absolute in both legs. Muscular twitching, trembling and slight spasms and exaggerated opisthotonos were present. Tetanic contractions on handling. Nystagmus was present. Some trismus, increasing on trying to force open her mouth. Pupils not dilated but very sluggish, did not contract to light as they should. Eyeballs rolled upwards, legs and arms show rigidity. She can move legs about and bend knee. Spasmodic movements at intervals. Feet extended, fingers contracted, whining has ceased, due to unconsciousness. Examination of ears shows only some opacities of ear drums. Examination of eyes showed disks and fundi normal. December 7, the sixteenth day, the temperature was 105; pulse could not be counted; respiration rapid and irregular; the pupils irregular, the left being dilated, neither reacting to light. She died at 4.30 P. M.

The peculiarities of this case were that the temperature was taken once each day at different times of the day and was never less than 103, mostly 103.5 to 104.5, that is, typhoid in character. The child never vomited. Took nourishment up to the last two days. Never talked after the onset, paying no attention unless she saw with her eyes, being apparently deaf. The pupils were normal in size and reacted to light up to the last 48 hours. The increased reflexes occurred late in the disease.

Dr. W. W. Wilkinson made the following report:

"Lumbar puncture 12.45 P. M. December 2, 1907. 60 c. c. cloudy fluid obtained. Smears showed abundant polynuclear leucocytes, a few round cells and a moderate number of small bacilli, with the morphology of the Bacillus Influenza. Organism Gram negative. Cultures on blood agar, plain agar and lactose-litmus-agar. Growth only on the blood-agar, at body temperature. This consisted of the minute dew-drop-like colonies of the Bacillus Influenza, and in all other respects conformed to the characteristics of this organism.

"On December 8, at 4 P. M., the skull was opened and brain removed. It presented the usual picture of meningitis. It will be noticed that the plastic exudate is most marked in the frontal region and at the base, particularly the tips of the temporal lobes.

"The spinal canal was not opened. The medulla and that portion of the cord removed with the brain is free of exudate. Inspection of the spinal canal from the foramen magnum showed no exudate and only congestion of cord and sheath.

"Cover slip preparations from the meningeal exudate showed the same bacillus as that obtained from the lumbar puncture, and cultures on blood-agar give a luxurious growth of the organism."

**Dr. Prentiss Willson** said that the case was of especial interest to him, as he had seen a case of influenza meningitis with Dr. Adams some months ago. In looking up the literature of the subject, he found that the question has been raised as to whether meningitis caused by Pfeiffer's bacillus is to be regarded as primary or secondary. An Italian writer cites a case in which a child was brought to a surgical clinic with a hematoma over the parietal bone; no fracture was found. Ten days later the same child was brought to the medical clinic suffering from meningitis, broncho-pneumonia and suppurating hematoma; at autopsy Pfeiffer's bacillus was recovered in pure culture from all three sites, and had previously been obtained in pure culture from the original fluid from a lumbar puncture. The same writer states his belief that it has been demonstrated that in meningitis in young children, Pfeiffer's bacillus is as often the causative factor as the meningococcus or pneumococcus.

**Dr. W. W. Wilkinson** said that this was the first case of influenza meningitis in this country coming to autopsy and from which the brain was removed—at least he could find no other case in the literature. The only organism found in the cerebrospinal fluid was Pfeiffer's bacillus. The antecedent history of whooping cough is of interest in view of the opinion advanced by some that an organism not distinguishable culturally or morphologically from Pfeiffer's bacillus is the causative agent in pertussis.

**Dr. Stuart** said that his case was the third in the United States, so far as the literature goes, in which a pure culture of Pfeiffer's bacillus was withdrawn by lumbar puncture.

Physican's Influence in the Community.—The successful physician occupies a place in the community of vastly greater importance than does any other individual, not even excepting the clergyman. The physician comes more directly in touch with the frailties, sorrows, aspirations and joys of humanity than does any other individual. His influence in the community, politically and socially, is, or, if he lived up to his opportunities, would be greater than any other.—*Jr. A. M. A.*

# CASE OF TRAUMATIC SUBLUXATION OF THE HUMERUS.*

(Abstract.)

By F. P. VALE, M. D.,

Washington, D. C.

The subject of the photographs presented received this injury in a fall from his bicycle, on his outstretched hand. It was regarded and treated as a sprain; all redness and swelling subsided in two or three days. Voluntary motion was abolished at first, but the next morning, after a little massage, some motion was possible.

At the time of my first examination, seven and a half weeks after the accident, the use of the arm was so painful and limited that he had not been able to return to his work as a plate printer. The under motions of the arm anteriorly were unrestricted, but not so posteriorly. The greatest difficulty, however, was in raising the arm beyond the horizontal; extending it in front, if assisted beyond the horizontal, he could continue to raise the arm to the perpendicular, and voluntary movements again became freer. On comparing the two shoulders it was readily noticed that the head of the humerus on the injured side was more prominent anteriorly, and on a higher level; the subluxation of the acromial end of the clavicle, readily seen in the first photograph, seemingly played no part in his disability. A corresponding flatness posteriorly was not so noticeable. On extending the arms laterally to the horizontal, the very marked deformity shown in the second photograph immediately attracted attention; the greater tuberosity seemed to lock against the acromion process, impeding further independent movement of the humerus beyond the horizontal. An x-ray negative showed there was no injury to the bony structure, no fracture of acromion or coracoid process, or chipping off of the anterior border of the glenoid fossa. Six months later the deformity had entirely disappeared, and though the functional restoration was not perfect it was nearly so.

I had advised the patient that he would probably recover the use of his arm in six months or a year, but, having in mind the part the long head of the biceps was said by some to play in such

* Reported to the Medical Society, January 22, 1908.

cases, I thought possibly his convalescence might be shortened by an effort to repair that tendon, if ruptured. He sought other advice and decided against any operative interference, and I lost the opportunity of throwing some light on the pathology of this subluxation ; one dissection convinced me that a study of dissecting room material would not enable me to add anything to the contributions already made from such sources, and that an autopsy *in vivo* would alone clear it up.

**Dr. Balloch** said that he has always been skeptical as to the possibility of subluxation occurring at the shoulder joint, if there has been no previous disease of the joint. Where there has been an old effusion into the joint, or disease with destruction of the bone, or paralysis of the muscles, a partial luxation may take place. To his mind, however, with a normal joint, luxation without rupture of the capsule is not possible.

**Dr. D. S. Lamb** said that his own belief coincides with Dr. Balloch's. Dr. Lamb thought that the question as to the subluxation of joints was pretty well settled in the negative, with the exception of the knee joint, in which the semilunar cartilages may become detached, and superior radio-ulnar articulation in which the orbicular ligament may get nipped between the bones. Although the literature of the subject is voluminous, he was under the impression that the matter was settled. Agnew, who had been quoted in the paper, was a consummate anatomist as well as a preeminent surgeon, and he had expressed himself as very skeptical as to the possibility of the subluxation in question. His opinion, to Dr. Lamb's mind, would constitute very strong evidence against the possibility of the lesion.

**Dr. Snyder** could not quite appreciate how subluxation could take place at the shoulder joint, and had similar difficulties as to the superior radio-ulnar articulation. He was unable to make a diagnosis in Dr. Vale's case, but thought it more likely that the man had received some injury to the shoulder muscles, except for the fact that he fell upon his hand. Dr. Snyder himself had had a very similar injury a few years ago, but there was no luxation.

**Dr. Vale** said that all had objected to the diagnosis, but none had suggested a substitute. The head of the bone was certainly not in its normal position, nor was it completely luxated ; the term subluxation alone described such a condition.

# LATENT AND ATYPICAL MALARIA, WITH ESPECIAL REFERENCE TO CHILDREN. REPORT OF CASES.*

By B. M. RANDOLPH, M. D.,

Washington, D. C.

It is hardly necessary to mention the fact that the classical picture drawn of malaria—the chill, fever and sweat of intermittent fever, and the typhoid condition presented by the remittent type, constitutes but a small part of malarial infection. Even when we have considered the multitude of complications and associated conditions described as atypical malaria, we have by no means completed the subject.

In this paper I shall try to present for your consideration the following points :

1. That the malarial plasmodium may exist for a long time latent in the human body without giving evidence of its presence.

2. That children are peculiarly susceptible to malarial infection, and serve as hosts for the organism far more frequently than is realized.

3. That children are often harborers of the malarial plasmodium without giving any clinical evidence of illness.

4. That children are even more prone than adults to atypical forms of this disease.

Before beginning the subject of latent malaria it may be well to mention what is accepted as to the incubation period of this disease. Billet[1] concludes that this period oscillates in the majority of cases between 10 and 15 days, with a minimum of 6 days, and a maximum which never exceeds 20–23 days. As Billett's figures are as liberal as those of any other observer whom I have found, we may accept them as a basis in discussing latent malaria.

It is a familiar observation that persons going from a malarial district to the mountains often develop malaria. This is so well known in malarial countries that it is a common saying that "going to the mountains brings out the malaria in the system." For some time, lasting from the discovery of the malarial plasmodium by Laveran to comparatively recent years, the state of

* Read before the Medical Society, January 22, 1908.

scientific knowledge on the subject was such that the aforesaid popular belief could not be reconciled with the rôle played by the organism. Scientists, therefore, in their self-sufficiency, either tried to explain such occurrences away, or else frankly disbelieved them as mistaken diagnoses of men untrained in modern methods of inquiry. When, however, men of unquestioned integrity and thoroughly modern equipment began to add their evidence to "popular superstition," the attitude of the scientists could not be maintained.

Holmes[2] (1904) reported three cases of malaria, occurring in Asheville, N. C. (a non-malarious region), the most striking of which was in a native of the Gulf region, who had not been exposed to malarial infection for eight months. This patient did not remember ever having had malaria. The diagnosis was established by blood examination. Holmes quotes Stengel as saying that he (Stengel) believes that "the change of climate may so alter conditions as to make a latent an active infection."

Pomeroy[3] (1905) reported the case of a man who had had recurrent malarial attacks for four years. His blood contained the parasites of aestivo-autumnal malaria. Pomeroy is impressed with the singularity of a case of aestivo-autumnal malaria having its origin in New York, for this man had not been outside of New York City for fifteen years. It seems probable that the infection was brought there in latent form by some one who fed the mosquito that inoculated this patient. It will be noted that the beginning of his illness (1900) coincided with a time when a large number of infected troops were returning home from the Spanish War.

Schilling[4] (1903) reports a case of malaria recurring eight and a half months after possible exposure to infection.

Basset-Smith[5] (1907) reports a case of hemoglobinuric fever occurring in a British naval officer at Portsmouth, England. This officer had been stationed in West African waters from 1897 to 1900. Since then he had been attached to the Channel fleet, and therefore not exposed to infection during that time. His attack began in 1905, after exposure to bad weather.

Nacht[6] (1899) says that after apparent cure has lasted for weeks and months the fever may break out again. This obstinacy plays an important rôle with seamen, because of their exposure to cold and wet.

Glax[7] says that malarial patients bear the dampness of higher regions badly, and, after long intermissions by the sea, the disease may recur in higher altitudes.

Mannaberg[8] states that indigestion, alcoholic excess, trauma, faradization of the spleen and seasickness may produce recurrence.

Strasser and Wolf[9] (1904) noticed in many patients who had had malaria, but who had been free from it for several months in a locality positively free from the disease, that while taking hydrotherapeutic treatment they had their water cure interrupted by severe attacks of malarial fever. They saw four such cases in which the diagnosis was confirmed by blood examination. They regard the spleen as the depositary for disintegrated red cells, and note that all diseases accompanied by much splenic enlargement have also extensive red cell destruction. They hold that the plasmodium of malaria may persist in the spleen for a long time; that malignant cases of malaria may show but few organisms in the peripheral blood, while the splenic blood is rich in them. Their theory is that hydrotherapy, electricity, etc., produce changes in the spleen and in its circulation which press out the parasites into the general circulation, and thus produce an attack of malaria.

Craig[10] has made a most thorough and valuable study of the subject. He defines latent malaria as "an infection in which the plasmodium of malaria can be demonstrated in the blood, but which presents no clinical symptoms of sufficient quantity to cause illness." This definition is the only one which can serve as a practical working basis, but it must be remembered that a latent malarial infection may exist, though the peripheral blood be free from parasites. Such a state of affairs could of course be demonstrated only by splenic puncture, or at autopsy. Craig examined 225 Philippine natives, and found latent infection in 115, or 51 per cent. He lays much stress on the importance of considering these as sources of infection in the campaign for the eradication of malaria. He says: "the natives are the culture tubes, holding the plasmodia, the mosquitoes the inoculating needles, and the 'stranger within the gates' the victim of inoculation." Craig has examined 1,297 cases of malaria in Americans (mostly soldiers invalided home from the Philippines), of which 307, or nearly 24 per cent., were of the latent type. In 1902, in San

Francisco, he examined a company of 60 men returning from the Philippines. Of the 47 remaining on duty, and apparently well, 27 showed malarial parasites in the blood.

He advances an interesting theory bearing on this subject in regard to the significance of intracorpuscular conjugation of the parasite. The most frequent and well-known method of reproduction of this protozoon is by sporulation. For this reason it has been called by some a sporozoon. Conjugation, that is where reproduction takes place through the union of two sexual bodies, was demonstrated in the mosquito by Ross. Ewing[12] (1900) first described conjugation taking place within the human red cell. Craig[11] has noticed it in a large number of cases, and believes that by this method of reproduction the organism is rejuvenated and prevented from dying out, as would otherwise occur through the exhaustion of the sporulating function; for, as sporulation in protozoa cannot keep up indefinitely, exhaustion of the race is prevented by a resort to another method of reproduction.

Concerning the susceptibility of children to malaria, and the frequency of this disease in them, some very interesting statistics are furnished.

In 1900 Koch[13] published the results of his studies in West Africa. He found that malarial infection exists very frequently in children apparently healthy; that this frequency diminishes with advancing age; that the infection is absent in the West African negro adult, who possesses an immunity to malaria. In a number of malarial districts Koch found: Under 2 years, up to 100 per cent. infected; 2 to 5 years, 46 per cent. infected; 5 to 10 years, 23½ per cent. infected; over 10 years, free from infection. He speaks of the condition of these children as being that of "rude health."

Stephens and Christophers[14], working in Accra, West Africa, found: Babies, 23 to 90 per cent. infected; up to 8 years, 20 to 57 per cent.; up to 12 years, 28 to 30 per cent.; after 12 years, infection rare. They say: "It must be understood that in speaking of a case of malaria in children, we are referring only to the presence of the parasites; the children are perfectly well, and present none of the characteristic signs observed in Europeans affected with malaria."

Annett, Dutton and Elliott[15], studying in Nigeria, found: Under 5 years, nearly 52 per cent. infected; 5 to 10 years, 25 per cent.; over 10 years, 10 per cent.

James[16] investigated three localities in India, with the following result: I. Up to 3 years, 80 per cent. infected; up to 5 years, 66 per cent.; up to 10 years, 50 per cent.; over 10 years, none. II. Up to 3 years, 65 per cent.; up to 5 years, 51 per cent.; up to 10 years, 46 per cent.; up to 15 years, 16 per cent.; over 15 years, none. III. No anopheles mosquitoes, no malaria, no infected children.

James took his cases without selection from children playing about the villages, who presented on casual examination no symptoms of malaria. His cases had, however, more or less enlarged spleens, anemia, sometimes edema, and rarely dropsy.

There is some interesting evidence to show that the placenta is permeable to the malarial plasmodium, and that a malarious mother may give birth to an infected child.

Moffatt[17] (1907) reports a case of congenital malaria. A woman living in Africa had malaria in the early months of pregnancy. Four months before delivery she returned to England, where there were no mosquitoes. Moffatt saw the child at the age of seven weeks, when its blood contained the parasites. Previous to that time the parents had observed no symptoms except anemia.

The most striking group of cases of congenital malaria is that furnished by Economos[19], of Sparta. He reports six cases where mothers who had malaria during pregnancy gave birth to children whose blood contained the parasite at periods varying from eight to forty-eight hours after delivery. A seventh case was that of a malarious mother who suffered from an acute outbreak immediately before confinement. The blood of this child was not examined immediately after birth. From the first the infant began to grow pale and weak. At the age of two months the blood showed parasites. Quinine wrought a speedy cure. This baby was born in December, at a time when mosquitoes do not bite in that locality. Economos did not find the spleen enlarged in any of his cases. He notes that the course of the infection in the new-born varies. Some are affected at once; some later; some show cachexia; while others are not affected at all.

Varlamidis[20] says that malaria can be transmitted from mother to child, and manifest itself either during intra-uterine life or immediately after birth.

Cardamitis[21], who has given the subject of malarial infection extensive study, expresses the same views.

That children are especially subject to atypical manifestations of malaria needs no lengthy argument to prove. Medical literature fairly teems with instances of it, and there is hardly a physician present whose experience will not supply examples. There are but few possible pathological conditions which have not been attributed to malarial infection. In going over the literature I have met with the following: pneumonia, splenic abscess, liver abscess, a great variety of paralyses including aphasia, renal, gastric, intestinal and retinal hemorrhages, dyspepsia, chronic gastritis, progressive muscular atrophy, rheumatism, traumatic rheumatism, sciatica, colitis and convulsions; and these by no means exhaust the list.

As we well know, the most vulnerable point in infants and children is the alimentary tract, and almost any affection not purely local is apt to cause digestive disturbance in these patients. Malaria is no exception to this rule, for we meet with gastro-enteric disturbance of malarial origin much more often than we do with the typical paroxysm. Glatard[22] describes pernicious infantile malaria as found in Algeria. Gastro-intestinal symptoms make up the entire picture. Intense fever of no specific character is present. The aspect is entirely that of an acute gastro-enteritis. It is most frequent at a season when severe gastro-intestinal disturbances prevail, which renders the diagnosis difficult. There is no time for blood examination, as untreated cases die in twenty-four to forty-eight hours. Only treated cases recover, and these recoveries are followed by anemia and constitutional depression. No treatment is of any avail except hypodermic injections of quinine.

Every grade of severity between the pernicious form described by Glatard and the very mild type exhibited by some of the cases I shall present to you has been repeatedly described by observers in all malarial countries. I beg to state that the following cases are in no sense studies. They all occurred in private practice, and at a time when I was unusually busy, and quinine was administered without delaying for the purpose of making an exhaustive study of the blood and clinical symptoms. I shall recite only enough to bring out the salient points.

Case 1.—White boy, five years old. Mother noticed in the morning that he was listless, had no appetite, and seemed to be feeling unwell. He had been well previously. I found him

with coated tongue and slight fever. Though I felt sure that I was dealing with some simple digestive disturbance, I took a blood specimen. Calomel was prescribed, to be followed by castor oil. The blood specimen was negative. On returning the next day I found that, though several stools had resulted from the medicine ordered the day before, the child was much worse. His temperature was 103 ; there were pronounced nervous symptoms—tremor of the hands, lips and eyelids, with nystagmus. Examination of the throat brought on copious vomiting. Another blood specimen was taken, and quinine prescribed. Malarial parasites were found in the second specimen. Recovery was prompt, though there was a slight recurrence of digestive trouble, due to stopping quinine too soon. This case never had any chill or sweat. He had not been ill previously. His initial symptoms presented the picture of a digestive upset, and those of the second day suggested the onset of one of the exanthemata.

Case II.—White boy, aged four years. On my first visit, September, 1906, the mother said the child had been suffering over two months with his stomach. The present attack had lasted a week. He was better on alternate days. I found him lying down, very pale, moaning, and complaining of severe pain and soreness over his abdomen. The pain was not increased by pressure. He was very constipated, showed marked tremor of the hands on moving them, and of the facial muscles on speaking. There had been no chill ; temperature was 102. Calomel was prescribed. Next day his bowels moved freely, and he felt pretty well, having a normal appetite, and playing out of doors. I took a specimen of blood at this time, and prescribed quinine. The blood contained malarial parasites. On the third day I was summoned, and found the conditions of two days previous much exaggerated. The temperature was 105, and the abdominal pain seemed to be intolerable ; perspiration was just beginning. I found that there had been delay in getting the quinine, and only two two-grain capsules had been given, one of which had been immediately vomited. I gave him four grains myself, and saw it retained. Continuation of the quinine quickly relieved the child, and he had no recurrence. There was no difficulty in making the diagnosis in this case, but the marked predominance of diffuse abdominal pain leads me to mention it.

Case III.—White female, aged three years. She had been per-

fectly well until the present illness, which began in the morning with listlessness, loss of appetite and constipation ; then slight coldness of the feet, followed by a rapidly increasing fever, which in a few hours reached 106. Castor oil produced several green stools, containing mucus and undigested food. The blood showed malarial parasites. She at once began to improve on eight grains of quinine daily, and there was no recurrence of the fever. In a few days the character of the stools was normal. This case would not have been differentiated from an acute intestinal attack, without the blood examination. Had not quinine been given at the outset it is probable that a more typical picture of malaria would have developed.

Case IV.—White female, aged fifteen months ; a fat, strong, apparently healthy child, except for a slight pallor. For several weeks she had been having periods of loss of appetite, associated with loose bowels, the stools containing undigested food. Castor oil would be given and the condition relieved, only to return again in five or six days. The child was on a modified milk diet, which had suited her perfectly previous to these attacks. The mother said the child had had no fever ; temperature at the time of examination was a little over 99. Examination of the blood showed malarial parasites. Quinine wrought a speedy cure, and there was no return of the digestive trouble. No change was made in this child's diet. This is one of the very mild cases in which the diagnosis is most difficult. Only my experience with other cases, coupled with the failure to explain the persistent recurrence of digestive disturbance, suggested the blood examination.

Case V.—White male, aged eight and one-half months ; was born in December, 1906, and was healthy until the following summer, when he began to have gastro-intestinal disturbance. He was taken to a Northern State, where there was temporary improvement, but the trouble soon recurred in the form of a severe and obstinate diarrhea. He was brought back to Washington early in September, when I first saw him. I found the following picture : What had always been a good, happy baby before his illness, had become fretful, restless, and slept badly ; he had a greedy appetite, but his food did not satisfy him ; his stools were frequent, liquid and green, and contained undigested food, mucus, and, at times, blood. The skin temperature was

subnormal at the time of examination, but the mother said he had fever at times. He had failed to gain in weight, and had a marked pallor. The mother had not noticed any unnatural sweating. He was given castor oil, and dieted for the intestinal condition. Blood examination showed the plasmodium of malaria. Two grains of quinine were given thrice daily, and in two days the digestive trouble was completely relieved. Here is a case that was a typical picture of obstinate "summer complaint," relieved at once by treating the malarial infection present.

Case VI.—White male, aged twenty months; was born in New York City, and was brought to Washington to live in September, 1906, when nine months old. His parents said that he had always been a healthy child until coming to Washington, where the climate never seemed to agree with him; that he had typhoid fever in November, 1906, and had never entirely recovered from it. I first saw this patient in August, 1907. He had been suffering for a week with diarrhea, malaise and loss of appetite. During the preceding two days he had been much worse, with restlessness, high fever, repeated vomiting and continued diarrhea. He appeared very ill, and the parents entertained grave fears for his life. His temperature was nearly 101. Calomel was prescribed; absolutely nothing else except water and a little brandy. The diarrhea was checked temporarily, but returned. On my second visit blood specimens were taken, and very small feedings of barley water begun. The blood showed malarial parasites. Six grains of quinine daily were begun. The diarrhea stopped twelve hours after the first dose, and rapid improvement set in. There was no stool for three days, when a large, perfectly normal movement occurred, and the bowels were regular thereafter. In four or five days the child was well in every respect, and continued so.

I have had two other cases in children of the same character as the above. They both had obstinate gastro-intestinal trouble, resisted treatment until quinine was employed, and were promptly cured by that drug. I have not included them in this group, because the plasmodium was not found in the blood. I have no doubt that they were cases of malaria, and believe that the parasites would have been discovered if quinine had been withheld until repeated blood examinations could have been made.

In regard to treatment, I would lay stress on the point that quinine should be discontinued gradually, and not entirely stopped for three weeks after the symptoms have subsided. All of my cases were given Fowler's solution of arsenic for four to six weeks.

Reflection upon the facts and cases I have presented leads us to the consideration of some interesting points. The most important is one that is emphasized by Craig, that is, that the destruction of mosquitoes is not the only item to be considered in the prevention of malaria. It is also necessary to bear in mind that persons who come among us from malarial regions may bear the parasites in their blood, and serve as distributing points for the infection, even though they give no history or clinical evidence of the disease. Craig urges that all such persons should have their blood examined, and that those showing malarial infection should be subjected to a course of antimalarial treatment.

Owing to our new relations with tropical and semi-tropical countries, there is a constantly increasing number of persons, especially those in the service of the Government, who are going to and fro between us and malaria-infected regions. This applies to Washington in a greater degree than to any other locality in the United States. It is not, therefore, unreasonable to expect the appearance in our midst of a certain number of cases of malarial infection which possess, to a greater or less degree, the characteristics of tropical malaria.

Another point is that apparently healthy infants and children may be sources of infection, preserving many strains of malarial plasmodia that would otherwise become extinct.

The third point I would mention is the importance of taking into consideration the possible presence of the plasmodium of malaria in obstinate affections of childen, where the diagnosis is not obvious, and giving them the benefit of a careful blood examination.

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**Dr. A. F. A. King** said that the paper was interesting and had well set forth the recent improvements in the recognition of malaria. He was especially interested in the cases in which children had been cured of gastro-intestinal disturbances by the administration of quinine. The paper had referred to the different manifestations of malaria in adult life and childhood; he recalled the fact that the tsetse fly of South Africa by its sting is fatal to mother cows, but is innocuous to calves. It would be interesting to study the causes of the difference in the behavior of malarial infection in adults and infants.

In view of the gastro-intestinal disturbances in some of Dr. Randolph's cases, is it possible that the plasmodium may escape into the intestinal canal and set up irritation there?

In former years many cases of latent malaria were reported in which outbreaks occurred without the possibility of new mosquito infection; were these outbreaks precipitated by exposure to brilliant sunlight? Some years ago he had advanced the theory that the malarial parasite required the sunlight for propagation, and that keeping the patient in the dark for a period would effect a cure. Latent malarial organisms may lurk in the dark recesses of the brain and spleen; any causes which would operate to bring these parasites to the surface, would under exposure to sunlight, allow of sporulation and a malarial paroxysm.

The paper indicated that progress is still being made in the study of malaria.

**Dr. Lochboehler** had noticed that Craig's statistics compiled in the Philippines gave 46 per cent. of the cases of latent malaria as occurring in soldiers, while Koch in West Africa had found his cases between the ages of 10 and 15 years—no cases after 15 years of age. He asked Dr. Randolph to explain the discrepancy between these figures.

**Dr. S. S. Adams** said that atypical malaria among children is an interesting field of study. He had had the opportunity of seeing a number of unique cases, but, unfortunately, he had not been able to confirm many of them microscopically. The hematologists usually explain the failure to recover the organism by affirming that the specimens were taken at the wrong stage. He wished for some method of determining the right stage. At the Children's Hospital Dr. Acker and he had seen many interesting manifestations of malaria, such as anuria, convulsions, etc. He, with Dr. Bowen, had seen a child which had suddenly gone into coma; a neighboring physician had been called and Dr. Bowen did not reach the patient until the second day, when the child was found to be comfortable and with no signs of illness except a slight fever. On the third day, after eating breakfast as usual, and apparently as well as usual, the child again went into profound coma at the same hour as the original attack. The circumstances of identical hour of attack and a day of freedom from attack made it clear that malarial infection was responsible for the phenomena; under quinine the child very promptly recovered. He had seen a somewhat similar case with Dr. Humes, of Marlboro (lately deceased). This was a boy who, after going to church with his parents on Sunday morning, suddenly became comatose soon after returning home; Monday he was better; Tuesday, coma, with scanty urine, occurred again; Wednesday, better; Thursday the coma was repeated, and on this day Dr. Adams first saw the child. He made a diagnosis of malaria and advised the administration of quinine; Dr. Humes combatted this advice, on the ground that quinine had already been given without effect. Inquiry brought out that only ten grains of quinine had been given and on only one day. Dr. Adams urged that thirty grains be given daily for several days, and under this treatment the boy rapidly recovered. These cases illustrate the atypical comatose variety of malaria; both cases were without much fever—the boy last mentioned had a rectal subnormal temperature. Other atypical cases are not so easy of recognition on account of the lack of periodicity of outbreak.

As Dr. Randolph's cases with gastro-intestinal disturbances occurred in August and September, digestive derangement would be expected in any infection happening at this season, and subsidence of the infection would naturally be followed by the cure of the gastro-intestinal catarrh. Dr. Randolph's cases were proven to be malaria by the microscope, but without such proof he would be slow to believe that the quinine had effected the cure. Dr. Adams believed that to be the usual mental attitude of physicians, and he rather deprecated that it should be so, because so many apparently typical cases of malaria occur in which the plasmodium cannot be or, at any rate, is not recognized. He thanked Dr. Randolph for the reports of his interesting cases.

**Dr. Williams** asked if in any of Dr. Randolph's cases projectile vomiting had been noted. The reason for the question was that in one case nystagmus was present, and in two tremor; in France cases have been described in which disturbances of equilibrium have been found to be dependent upon lesion of a nucleus in the floor of the fourth ventricle. Near this nucleus is the nucleus of the vagus, irritation of which may cause vomiting; also the oculo-motor nucleus. It is well known that irritation of one nucleus may not be expressed by its nerve distribution, but the stimulus may overflow and be expressed by irritative symptoms of another nucleus. For these reasons it would be interesting to know if either projectile vomiting or vertigo had appeared in the cases reported by Dr. Randolph.

**Dr. Snyder** said that latent malaria may be awakened into activity by surgical operations. He has had a number of cases which presented typical pictures of malaria, with chill, fever and sweat, after surgical operations, in which sepsis could be excluded; in these cases quinine quickly effected a cure. Last summer a patient in Alexandria, from whom he had removed a large cyst, had a typical explosion of malaria.

**Dr. Mackall** said that the same phenomenon may be observed after parturition.

**Dr. E. L. Morgan** said that Dr. Randolph had spoken of immunity to malaria among negroes of the African West Coast. Dr. Morgan could not speak as to that, but among the South African negroes immunity does not seem to exist. In the dry season of the year they never wash, because to do so invites infection and causes fevers. According to Croonenberghs, the missionary priests who dwell among these people were told to beware of bathing in the dry season; some disregarded the advice and were promptly infected and died; others who conformed to the precaution lived for years in the country in good health. An example of acquired immunity is the reputed fact that Arabs drink from pools of water filled with typhoid fever germs and seldom acquire the disease, while Europeans drinking the same water acquire a most malignant infection and die.

As to the awakening of malaria by surgical operations, it is rather common in malarial districts to hear that a paroxysm has been determined by a fall down the stairs, a fracture, or something of that nature.

**Dr. A. F. A. King** suggested that the hemorrhage which accompanies a surgical operation of any magnitude, and which always accompanies parturition, may cause such a disturbance of the general circulation as to cause the emigration of dormant malarial parasites from the dark, deep recesses of the spleen and other organs into the peripheral circulation, where, under the influence of sunlight, sporulation may take place, thus determining a malarial paroxysm.

**Dr. Roy** said that there could be no doubt that sunlight has some influence upon the course of malaria. He had a large personal experience with malaria when a boy and he had learned to keep out of the sun on his chill day; by doing so he could modify, delay or entirely escape the expected chill. A fact of interest is that two-thirds of the cases of malaria along the Rappahannock river, where he spent his boyhood, originate before the tenth year of age; he himself for years had chills summer and winter, but never had another attack after he was twelve years old.

**Dr. Muncey** reported a case of recurrent headache due to latent malaria. A girl had had typical malaria 18 months ago, during which attack Dr. Prentiss had demonstrated the parasite. Recently she consulted Dr. Muncey for headaches; all sorts of remedies were tried and her eyes were examined for possible astigmatism, but the headaches continued with unabated severity. It was noticed finally that the girl sought relief every two weeks with rather constant regularity; this periodicity induced Dr. Muncey to put her on quinine, which effectually put an end to the headaches. After discontinuing the quinine for a time the headaches returned; quinine was resumed, and the patient was again relieved. The paper confirmed her belief that the condition of the patient was due to latent malaria.

**Dr. Acker** said that he had listened to the paper with delight. He agreed with Dr. Adams that many cases of typical malaria from the clinical standpoint are to be met with, but in which the plasmodium cannot be demonstrated. Dr. Acker himself had had malaria some years ago, and the parasite was never found. The fact remains that quinine cures these patients if it be given in adequate doses. As to latent malaria he recalled having seen two patients in the same family at the same time, both of whom had congestive chill; one of the patients died. They had recently come from South Carolina, where they had never had any sign of malaria.

**Dr. Wise** said that the difficulties of accurately recognizing malaria by the clinical signs are great. In the Naval service, since the microscope has been generally introduced, the returns for malaria have been reduced 50 per cent. He was inclined to look with skepticism upon the diagnosis of malaria as the cause of coma and other protean nervous symptoms in children, if not verified by the microscope.

Combined infection is the cause of many atypical cases of malaria; the most common being that of the tertian and quartan parasites, giving rise to recurring paroxysms, one form assuming activity as another form becomes passive. Sometimes two forms may be simultaneously active and thus give rise to the most confused clinical picture. Wood, of Wilmington, N. C., has made blood preparations showing two parasites. In the administration of quinine an important point is that this should be during the

intracorpuscular stage, just before and as long as 24 hours thereafter.

**Dr. Brown** called attention to the frequent inefficiency of quinine when given in pill or powdered form. It may, however, be depended upon when given in solution ; combined with aromatic sulphuric acid, for instance, it may be relied upon to control malaria very speedily.

**Dr. Bishop** said that the early years of his professional life were spent in the North Carolina rice fields, where he had observed malaria in all its manifestations. He remembered a boy he was called to attend for severe abdominal pain ; he gave the usual treatment for such conditions and the boy was relieved ; but the pain recurred on the next day and the next ; he then gave quinine and the pain vanished, with no return. In his own experience, children did not usually present an initial chill but usually had convulsions with high fever ; at that time he was inexperienced and had to rely on his own resources, so that he lost a number of children by treating the convulsions with bromides and other antispasmodics. He soon began to recognize these cases as malarial, and with the use of quinine he began to save his patients. At college he had been taught never to give quinine to pregnant women ; but he met with cases in which he had no other recourse, and never saw any ill effects from the drug. He had been surprised to find so many cases of malaria in Washington ; he had one case of pernicious malaria in South Washington. Dr. Randolph had spoken of the ill effects of electricity upon malarial subjects ; it may easily be understood how the contractile effect of electricity upon the spleen may drive out parasites hidden in that organ and thus set up active manifestations. Dr. Crafts, of New York, has related that his brother, who in South Carolina had suffered from chronic malaria, had been cured after coming to New York simply by working around the high-frequency machine. Dr. Bishop called attention to the claim that in chronic stages where quinine no longer has any effect, methylene blue may produce a cure.

**Dr. Randolph** said that Dr. Lochboehler had raised an interesting question by referring to the apparently conflicting figures of Craig and Koch ; it may best be explained upon the theory of acquired immunity. Craig's cases were largely among soldiers and recent immigrants, all non-immune ; Koch's cases were among natives in whom immunity may be supposed to be acquired in childhood. It is interesting to note that it has been suggested that the oily skin and body odor of the negro may be protective from the mosquito.

As to the diagnosis of malaria without microscopic confirmation, he was not disposed to go as far as Dr. Wise in skepticism. There are many cases in which the organisms do not appear in the peripheral circulation ; in these it seems fair to make the diagnosis on clinical evidence.

The generally accepted explanation of the occurrence of malarial outbreaks after surgical operations is that the temporarily lowered resistance allows of propagation of the organisms already present.

With regard to the question as the occurrence of projectile vomiting, vomiting had occurred in only one of his cases; the reflex was occasioned by the use of a tongue depressor, and to his discomfiture, was decidedly projectile.

The dosage of quinine should be regulated by the severity of the attack, and, within reasonable bounds, is limited only by the quantity necessary to effect a cure. He had found it necessary to administer it hypodermatically in only one case, an adult, in whom certain complications made it impracticable to give the drug by mouth.

## PHLEGMONOUS GASTRITIS, WITH REPORT OF A CASE.*

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Washington, D. C.

Phlegmonous gastritis is a term generally used to designate a diffuse or a circumscribed suppurative inflammation of the gastric submucosa. In many cases, however, the process has been found to extend into the muscular layer and occasionally, also, into the mucosa.

As the literature of this subject has been reviewed during the past few months by three different authors, namely: Dr. Bovée, of this city, Dr. Robertson, of Boston, and Dr. Cecil, of Baltimore, I will confine myself here to a brief description of the disease, with the report of a case of the diffuse variety.

It is a condition rarely met with. According to Dr. Robertson, of Boston, ninety-one cases are on record. The disease is thought to be due in the great majority, if not in all cases, to the entrance through the mucous membrane of some pyogenic microorganisms. The organism found in many cases is the streptococcus. The point of entrance may be an ulcer, a carcinoma or trauma; but, in many cases, as in the one here reported, there is

* Read before the Medical Society, January 29, 1908.

no demonstrable defect in the mucosa. It occurs most frequently in middle-aged men of the laboring class, although cases are reported occurring in children and in the aged. The continued use of alcohol is said to be a predisposing factor, and chronic gastritis is often an associated condition.

The most constant symptoms are pain in the region of the stomach, nausea and vomiting, fever, accelerated pulse, collapse and death. There may be an initial chill, extreme tenderness, intense thirst and diarrhea. Occasionally there is no fever and but little pain. A tumor mass has been palpated over the stomach in the circumscribed variety. General peritonitis occurs frequently, and often quite early in the disease. The disease is seldom diagnosed *ante mortem*. The course of the disease is rapid. Robertson gives the average duration from four to six days and states that ninety-eight per cent. of all cases terminate fatally.

There is no treatment for the disease except in the circumscribed variety. In this form, the part should be opened and drained. Bovée and Mikulicz each operated on one such case with recovery.

The case here reported occurred in the service of Dr. H. R. Hummer, at the Government Hospital. P. S., male, white, aged 64, occupation soldier. He was admitted into the hospital March 13, 1889, suffering with melancholia. He gradually became more and more reduced mentally and for a number of years remained in one of the chronic wards of the hospital. He enjoyed fairly good physical health until April 19, 1907, when the attendant noticed that he appeared to be ill and sent him to the hospital ward. Temperature at 2 p. m. was 103, pulse 114. There was no pain and no other symptom of disease. The next morning his temperature dropped to 99, pulse to 110. He vomited his breakfast and was nauseated at times during the day, but remained quietly in bed and slept during the afternoon. Temperature that night was 101, pulse 96. On the 21st he seemed somewhat improved; did not vomit or complain of discomfort; bowels moved freely following the cathartic of the previous evening. He slept a great deal during the day. Physical examination negative. Temperature and pulse subsided to nearly normal. The next day, April 22, he vomited several times, and at 2 p. m., the nurse reported that the temperature was 100, and that he was restless and complained of pain in the abdomen. At 4 p. m., these symptoms were still more marked and his temperature rose

to 102.5. I saw the case at 5 o'clock with Dr. Hummer. The patient was vomiting a quantity of bile-stained fluid, lay on his left side with his legs well flexed and complained of pain in the abdomen. He could not well localize the pain. Physical examination of the abdomen showed very slight distension, no tumor palpable, some rigidity of the muscles, most marked on the right side, and decided tenderness, most pronounced along the right side. On percussion, the entire abdomen was dull. From these symptoms we made a diagnosis of beginning peritonitis, and were inclined to believe that it originated from the appendix. We recommended early operation, and I operated two hours later.

An incision was made along the outer border of the right rectus muscle, and on opening the peritoneal cavity a small quantity of slightly turbid, pale yellow fluid containing shreds of lymph, escaped. It was at once apparent that the patient had peritonitis. While endeavoring to bring out the appendix, which was retrocecal in position, and together with the cecum bound down by numerous old adhesions, the patient collapsed. The aorta was palpated and found to be pulseless. The incision was enlarged and cardiac massage resorted to, but without avail.

*Autopsy.*—Aside from the stomach, the first portion of the duodenum and peritoneum, the post mortem findings showed nothing of special interest. The peritoneum showed recent acute inflammation, most marked under the liver and down the right side. The stomach wall, and to a less marked degree the first five or six cm. of the duodenum, as you can see, are infiltrated with pus throughout. The stomach wall is four or five times its normal thickness. When fresh it was soft and crepitating to the feel, and pus could be squeezed out readily from the cut surface. Aside from the slight post mortem changes, the mucous membrane appears to be normal. There is no perceptible lesion of the mucous membrane to indicate the entrance of the infection, and likewise none on the peritoneal surface of the stomach to indicate the exit of infection into the peritoneal cavity.

*Microscopic examination*—There is marked cellular infiltration of the submucosa, extending deeply into the muscular coat. There appears to be some increase in the cellular elements of the mucosa, also, and the surface shows some degenerative change. The cellular elements are chiefly polymorphonuclear leucocytes, but there are numerous large and small lymphocytic and phago-

cytic cells. There are numerous distended veins containing thrombi. A few of these thrombi show polymorphonuclear leucocytes around their edges.

We neglected to look for the organism present in this case, and could not demonstrate any organisms in the sections, but from an accidental infection occurring in sewing up the body, we have reason to believe that it was streptococcus.

I am indebted to Dr. Blackburn for his assistance and for the preparation of the histological specimens.

**Dr. Bovée** said that the case reported by Dr. Hough was like most of those previously reported—the diagnosis was made at autopsy. Of the suppurative variety, there are 67 cases on record; the other cases were phlegmonous, without the presence of pus. In three cases the diagnosis was made before death; in four cases supposed to be suffering from this form of gastritis, recovery followed. There are two varieties of suppurative gastritis—circumscribed and diffuse; the circumscribed form has been known since 1620. There are only about 120 cases of all varieties in the literature. The mode of invasion is in doubt; usually no abrasion of the mucous membrane has been found at autopsy. The reported cases have been widely distributed; two cases have been seen in Washington. The youngest case on record was in a child 10 years old. It seems to be more frequent in men than in women. The diffuse variety is seven times as frequent as the circumscribed. The symptomatology is obscure; there is nothing pathognomonic. Alcoholism as a cause is not well founded; in only a small percentage of the cases was addiction to alcohol noted. In four cases surgical intervention was instituted; only one of these cases, his own, was of the suppurative variety. Von Mickulicz and Mayo Robson have each had one case; both were fatal and neither was of the suppurative form. His own case was about the first case operated on with recovery. The patient was a woman, housewife, multipara, in previous good health. After a very hearty dinner there was no distress; later an equally hearty supper, including shell fish, was indulged in. During the night she began to suffer with severe pain; Dr. Dorsey saw her at this time and found it necessary to give morphia. The next day pain and vomiting continued, and it was impossible to secure an evacuation of the bowels. Her condition became alarming and she was brought to the hospital. After admission, the obstipation, pain and vomiting continued; a diagnosis of intestinal obstruction was made. The condition was complicated by pregnancy of five months duration.

Upon opening the abdomen, the search for an obstruction was

fruitless, but exploration around the stomach brought to light a thick, reddened tumor near the pylorus. He opened the stomach for better inspection of the mass and it was found that the pylorus was so pressed upon by the swollen tissues as to be almost completely obstructed ; it was evident that the mass was an abscess. Accordingly the stomach wall was closed ; the abscess was incised, the pus sponged away, gauze packed about the site and drainage through the abdominal wall instituted. On the fourth day water was given by mouth ; on the fifth day liquid food was given and found to escape along the gauze drain ; after that solid food was given, with no more leakage. The patient aborted on the fifth day.

The bacteriology of these infections of the stomach has not been worked out ; that the infection arises from within the cavity of the stomach by invasion through the mucous coat has not been proven.

**Dr. I. W. Blackburn** had little to add to the discussion, but wished to explain some features of the sections shown under the microscope. The inflammatory infiltration of the deeper layers of the mucosa is difficult to make out because the structure here is normally rich in cells. The suppuration could be demonstrated in the submucosa for the most part ; there was not much invasion of the muscular coat by polymorphonuclear leucocytes, though the muscular fibers might be seen widely separated by an exudate of serum, endothelial cells and lymphocytes. The proliferation of endothelial cells and lymphocytes may probably be accounted for by the primary processes of the lesion ; they are not to be seen in ordinary catarrhal gastritis, but are numerous in the suppurative form. This was the first case of phlegmonous gastritis he had met with in his autopsy work ; he had, of course, seen suppurative processes accompanying carcinoma of the stomach.

**Dr. D. S. Lamb** had never seen a case and there is no specimen of the disease in the Army Medical Museum.

**Dr. Macatee** had seen in Garfield Hospital a colored woman, about 30 years of age, who presented the following symptoms : epigastric pain, tenderness and palpable tumor ; pain on taking food, nausea and vomiting ; variable fever. The diagnosis was obscure, but the idea of gastric cancer was entertained in spite of the woman's age. The Residents were instructed to obtain the gastric contents for chemical examination. Upon passing the tube a small quantity of pus escaped, and subsequent examination disclosed that the tumor had disappeared. The diagnosis of intramural abscess of the stomach was made, but can never be proven as the woman made a complete and rapid recovery.

**Dr. Hough** mentioned, in closing, that in a few cases the history mentions the coexistence of pregnancy; Dr. Bovée's case was of this kind. As to the portal of entrance of the infection, he had no suggestions to offer and thought it a difficult question to answer.

# CASE OF SOLITARY KIDNEY; URETERO-PYELO-NEPHRITIS; SYPHILITIC CONTRACTION AND ATROPHY OF LIVER.*

By D. S. LAMB, A. M., M. D.,

Washington, D. C.

The specimens are from a mulatto woman, age 39, married. She was admitted to hospital, January 21st, and died on the 25th. The history is imperfect. She is said to have had cystitis about January 1st; her symptoms suggested pelvic peritonitis, but the post-mortem examination showed that the peritoneum was normal. When admitted to hospital she had occasional vomiting; no rise of temperature; pain in right side of abdomen between umbilicus and gallbladder. On the 23d the vomiting became bilious, and on the 24th was said to be stercoraceous. An operation was suggested, but declined.

The post-mortem examination showed the body well nourished; some pitting of lower limbs; wrinkling of abdomen as after pregnancy. The head, neck and spine were not examined. The heart was normal; white clots in cavities. Lungs collapsed; some old adhesions; substance normal. Bronchial glands enlarged, darkly pigmented, cheesy and calcareous. Stomach congested, and contained mucus and bile. Small intestine collapsed; large intestine contained fecal masses, apparently mainly casein (she had been fed mainly with milk); no obstruction. Liver weighed 51 ounces; showed a few old adhesions; left lobe markedly contracted; some contractions in right lobe. Spleen showed opaque thickenings of capsule. Pancreas normal. Left kidney absent; left suprarenal capsule present. Right kidney showed pyelo-nephritis. Ureter thickened. Bladder contained pus-like liquid. Uterus normal; contained blood clot. Hemorrhage in left ovary. (She menstruated while in hospital.) Both ovaries cystic. Tubes normal.

Bacteriologic examination by Mr. Neate, Army Laboratory; the abscesses of the kidney contained three different organisms. There were a few colonies of *bacillus fluorescens liquefaciens*, which is common in water and putrefying infusions, but is not considsidered pathogenic. There were also a few colonies of a bacillus

* Reported to the Medical Society, February 5, 1908.

of the Friedlaender group, the particular one, however, not yet determined. But there were abundant colonies of type B of the *bacillus coli commune*, and it would appear, therefore, altogether probable that the cystitis, the ureteritis and pyelo-nephritis were caused by the colon bacillus.

I think that there should be no doubt that the liver is syphilitic, although no other syphilitic lesion was found.

**Dr. Hagner** said that there was no question in his mind that the pyelonephritis had been due to an ascending infection; all the inflammatory process was in the neighborhood of the pelvis, none in the cortex. The specimen was of interest to him, as all of the solitary kidneys that had come under his notice had been of the horseshoe variety. The case illustrated the importance and advantage of ureteral catheterization in cases of pyuria. He spoke of a case of solitary kidney having two ureters, one coming from the superior pole, the other from the inferior pole. One pole of this kidney became infected and pus-laden urine could be collected from its ureter; the urine from the other ureter was clear.

**Dr. Roy** said that an interesting medical point was that there had been no symptoms of uremia in a patient with a single kidney, and that badly diseased. He suggested the possibility that the deterioration of the liver, which had been described by Dr. Lamb, had resulted in a diminution in the formation of urea and other materials necessary for the production of uremia.

**Dr. Lamb** said that a bacteriological examination had been made in this case; the bacillus coli commune (beta type), was found in large numbers; there was also a bacillus of the Friedlaendar type, and a water bacillus. The colon bacillus probably reached the kidney by way of the bladder, cystitis of colon origin being rather common. He did not venture on an explanation of the relation between the diseased liver and the absence of uremia.

## Discussion of Report of Committee on Public Health on Diphtheria, Scarlet Fever and Measles.*

**Dr. Woodward** called attention to the fact that the burden of preparing the voluminous report of the committee had fallen for the most part upon Dr. Chappell, and congratulated Dr. Chappell upon the result of his labors. The statistics presented were too many and too complex to be discussed intelligently without careful study. Dr. Woodward attributed the diminution in the mor-

* January 15 and 29, 1908. The report was printed in the January Annals, p. 496.

tality in scarlet fever in the District of Columbia that followed the enactment of the compulsory notification act of December 20, 1890, to two factors: enforced isolation of the patient and education of the public. Observation had shown that physicians commonly discontinued attendance with the disappearance of the acute symptoms, leaving the family to determine when infectivity had ceased. The family, finding the isolation of the patient irksome, inclined, even though carefully instructed by the physician, to release the patient too soon, and the spread of the disease resulted. With the passage of the act a certain responsibility rested on the physician and on the family of the patient, and more care was exercised. Enforced exercise of such care and the compulsory disinfection of articles supposed to have been infected, the posting of the placard, and the judicious dissemination of literature rendered possible by the reporting of cases, all tended to educate the public with respect to the danger of the spread of the disease, and in that way, even aside from the absolute requirements of law, tended to limit the spread of the disease.

It is more difficult, probably, to discover the factors influencing the mortality from diphtheria. Since the diagnosis of diphtheria has been almost altogether dependent upon the finding of diphtheria bacilli and since the antitoxin treatment has been so generally adopted, figures are no longer comparable with figures pertaining to earlier periods. It is known, however, that many persons who present no clinical evidences of diphtheria, as such evidence used to be described, carry the germs with them. The danger from these persons is in no way diminished by the law requiring the compulsory reporting of diphtheria, because at the time of its enactment such cases were not recognized as diphtheria at all. As a consequence, although the law strengthened the quarantine of clinical cases of diphtheria, it did not, until some years after its enactment, diminish the dangers from bacillus carriers, and for that reason the mortality from the disease was not affected. Moreover, even after the enactment of the law providing for the quarantine of diphtheria patients, such patients were for years discharged immediately upon the disappearance of the clinical symptoms, whereas, we know now that such patients themselves carry the germs with them for much longer periods and are themselves bacillus carriers. In view of these circumstances, it is not remarkable that the enactment of the law of 1890 did not, in the District, reduce the mortality from diphtheria.

The cause of the reduction of the mortality rate from measles is more difficult to account for. The education of the public, with respect to isolation and disinfection, brought about by compulsory isolation and disinfection in connection with scarlet fever and diphtheria, may have rendered it better able to care for such cases.

Dr. Chapin's views with respect to terminal disinfection, to which the committee has referred, are probably very generally misunderstood. Dr. Chapin believes, as Dr. Woodward understands his belief, that disinfection throughout the entire course of the disease should be so thorough as to render terminal disinfection unnecessary, and that if terminal disinfection is done by public authority, persons in charge of patients may be led to rely upon it and to be, therefore, careless during the course of the disease, with a consequent danger to the community during that time. Most health officers, however, seem to believe that instead of forcing the householder to rely upon his own efforts, it is better to supplement those efforts by terminal disinfection, which, instead of doing harm by rendering the community careless, does good by educating it, with respect to the necessity for disinfection and the methods of accomplishing it.

**Dr. A. F. A. King** commended the report as a work of great importance and interest ; he congratulated the members of the committee. The figures collected so carefully and analyzed so skilfully surely demonstrate the vast improvement which has been effected in the public health and safety by the municipal control of infectious diseases.

**Dr. Kober** added a word of congratulation to the chairman and members of the committee. He endorsed the conclusions and recommendations. When the reduction in the mortality from the three diseases reported upon had been so clearly demonstrated, and when it was pointed out that the reduction was synchronous with the general establishment of public quarantine measures, the conclusion that the facts were cause and effect could scarcely be avoided. The universal use of antitoxin has had much to do with the improvements in the statistics of diphtheria. The use of antitoxin has robbed diphtheria of much of its terror, and has made it much more amenable to control ; but measles and scarlet fever may be as formidable as ever, and the public has a right to be warned of the presence of these diseases. Whatever differences of opinion may exist as to the size and location of warning placards, in some way the public should have notice of the existence of danger. He believes in the intense virulence and great longevity of the scarlet fever contagium ; he has not forgotten his experience at Fort Whipple, where scarlet fever infection was brought from fifty miles away, resulting in a terrible epidemic. Measles is equally transmissible. Diphtheria is not nearly so contagious, and, as had been said, antitoxin gives some measure of control ; placards might, perhaps, be omitted for this disease, but there should be no relaxation in scarlatina and measles.

**Dr. Hickling** added to his congratulations some sympathy for the committee in the task of getting the statistics contained in the report. He does not place entire confidence in the figures,

however, on account of the different methods of keeping data in different health offices. In many communities there is a tendency to suppress the actual rates of contagious diseases on account of business considerations; a high rate of contagious diseases might have a bad effect commercially.

He thought that better hygiene, better nursing and more rational treatment should be added to municipal quarantine and public education as causes of the reduction in the mortality of the diseases in question. He would not, of course, underestimate the importance of quarantine; indeed, he thought that both morbidity and mortality from the exanthemata might be still further reduced by adopting the stringency of smallpox quarantine, though he did not by any means advocate such a step.

He agreed with the recommendation of the committee with respect to the placing of placards, but he believes that the placards give information to friends and neighbors that they have a right to know. For business reasons, men are very apt to conceal the presence of contagion in their homes. The suggestion that special hospitals be constructed for the treatment of all contagious diseases is a valuable one, but not yet available. He had hoped the committee would suggest some way of shortening the quarantine period for some of the diseases; it had occurred to him that the quarantine period for measles is ridiculously and arbitrarily long; there is no reason to believe that all cases are infectious an equal length of time. Also, desquamation in scarlet fever is not an accurate guide to the persistence of contagiousness; it has been demonstrated that patients declared safe by experts have been capable of transmitting the disease. The control of diphtheria may be open to suspicion on account of the ease with which negative cultures may be obtained by carelessness or bad faith in taking the culture.

**Dr. Williams** said that while he was no longer actively interested in the diseases investigated by the committee, as a former District Medical Officer he greatly admired the report. He remarked upon the different methods of quarantine that obtain in the United States and the British Isles. In England there is compulsory notification, but no municipal quarantine; the improvement in mortality rates has been brought about by the education of an intelligent public. The establishment of special hospitals for contagious diseases has also been a factor of improvement. His experience in watching the ravages of a measles epidemic in a Boer refugee camp, which followed the refusal of the people to submit to quarantine measures, illustrated forcibly the danger of an uneducated public opinion.

**Dr. Atkinson** does not believe that quarantine measures have been carried far enough; when we have a national Secretary of Health and a national quarantine system results will be better. He wished the committee had embodied in the report a recom-

mendation of the creation of the office of Secretary of Health. He had under his care a bride who had come to Washington on her bridal tour, arriving with an attack of scarlet fever. She had come from a town where scarlet fever was prevalent, had traversed several States with the disease and had introduced a new case into this city. Such an occurrence should be made impossible by the creation of a national Department of Public Health.

**Dr. Chappell** disclaimed the entire credit for the report, and said that other members of the committee had contributed valuable aid in its preparation. He appreciated the kind remarks that had been made. Many other recommendations and inquiries had been suggested by the study, but had to be omitted for the sake of brevity. With regard to the length of quarantine for scarlatina, experiments have demonstrated that the contagium dies in the epidermis after a number of weeks, and that late infection may be spread by the secretions of the nose and throat. The failure to control diphtheria more effectually may be due to intermediate carriers and to careless culture taking. The studies had taught him that in the British Isles measles is a more formidable disease than scarlatina and diphtheria. There is room for difference of opinion as to the efficacy of placards; personally he believes that their use is demoralizing and unnecessarily alarming. He believes that direct contact is necessary for contagion; he has little faith in the spread of disease by fomites. Isolation in one room, with careful disinfection all during the course of the disease, will usually and effectually control the infection. Quarantine may work unnecessary hardship in many instances. The abolition of the placard system will, in his opinion, be productive of better morbidity statistics.

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Honor in Practice.—The majority of men want to do right. The majority of those who go wrong in our profession do so for the lack of instruction rather than from bad intention at the outset. The curse and blight of jealousy and evil speaking, confined always to those practicing in the same community, and the universal experience that no one has ever permanently profited by yielding to the temptation to take part in these things, or by the practice of any of the "Black Arts," should be iterated and reiterated until the faces of young men are set against these besetting sins.—*Jr. A. M. A.*

# THE CAUSES OF TYPHOID FEVER IN THE DISTRICT OF COLUMBIA.

A symposium, in which the following persons took part: Dr. G. L. Magruder; Major Spencer Cosby, U. S. Army and Mr. F. F. Longley, of the Office of the Washington Aqueduct, and Messrs. H. W. Wiley, B. M. Bolton and C. B. Lane, of the Department of Agriculture; and Dr. M. J. Rosenau, Dr. L. L. Lumsden and Mr. J. H. Kastle, Bureau of Public Health and Marine Hospital Service, followed by a discussion.

## Introductory Remarks.

By G. LLOYD MAGRUDER, A. M., M. D.

Washington, D. C.

At a meeting in this very hall, on February 5, 1894, of the Sanitary League, a society formed for the welfare of the District, the late Dr. Charles Smart, U. S. Army, read a paper upon Typhoid Fever in the District of Columbia. His statements showed such a serious condition that I called the attention of this Society to the facts at a meeting held two evenings later. The late Drs. W. W. Johnston, C. M. Hammett and myself were appointed a committee to investigate this question. This committee labored earnestly, and submitted its report June 6, 1894, having given five months' continuous attention to the work.

It considered in this report—

"1. The prevalence and mortality of typhoid fever in the District.

"2. The relations of the dissemination of the disease to the—

(*a*) Public water supply.

(*b*) To the pollution of the soil with the leakage from privies, defective sewers and from the backing up of sewage from tidal movements.

(*c*) To the drinking of well or pump water.

(*d*) To contaminated milk and to other causes.

"3. The difference in mortality in different areas of the city, with a view to discover the causes of the disease.

"4. Conclusions based upon the foregoing data as to what measures should be taken to diminish the spread of the disease.

"It was disclosed that conditions were even worse than Dr. Smart had represented them to be. The facts ascertained were

of such a nature that the Committee felt warranted in concluding its report as follows :

"RECOMMENDATIONS.

"The Committee would urge upon the Medical Society the importance of taking the initiative in the effort to control the spread of this destructive but preventable disease by urging our municipal government and upon Congress the prompt adoption of measures to remove the causes to which this report has drawn attention.

"The measures to be recommended are :

"1. The immediate abandonment of all wells within the city limits, exception only to be made in case of the absence of the Potomac supply, and where the wells, after repeated chemical and bacteriological examinations, have been found to be free from all possible sources of danger. But even these to be abandoned as rapidly as possible.

"2. Purification of the sewerage system already existing, by replacing as rapidly as possible all damaged or defective drains.

"3. The introduction of new sewers in advance of other improvements in parts of the city not now supplied with drainage, and the extension of the system far outside the city limits as the rapidly-growing population demands, so as to prevent soil contamination.

"4. The adoption of some system by which the lower sections of the city can be more completely drained and the risks arising from the backing up of tide water and sewage prevented.

"5. The final and safe disposal of the sewage.

"6. To make all existing privies, vaults or other receptacles of human excreta watertight, and by rigid inspection and penalties to prevent the danger from leakage and overflowing.

"7. The early completion of the plans recommended by Colonel Elliott (in charge of the Washington Aqueduct), and now in course of execution, which have in view the sedimentation of the Potomac water and ultimately the completion of works for filtration, the only proper means of purification.

"8. The suppression of all privies and the enforcing of the law to make sewer connections.

"9. Careful inspection of all dairies in the District from which our milk supply is drawn, and the enactment of a law by which

no milk shall be sold in the District without a permit from the Health Officer. The inspection should cover an examination at the dairies of all possible sources of infection, including the water supply.

"10. The urging upon the members of the profession of a careful collation of all the facts bearing upon the mode of infection in each case, and the advantage of reporting such facts to the Society, and the propagation of the doctrine that immediate disinfection of the stools is the first duty of the physician as guardian of the health of the community."

The recommendations were unanimously endorsed by the Society and attracted at once the attention of the Commissioners of the District, as well as that of Congress.

Writers upon these subjects from that day to this have, without variation, also endorsed these recommendations. The Society was invited by the Commissioners and the Committees on the District of Columbia of both branches of Congress to lend its aid in framing the necessary legislation to remedy existing conditions. Time and again have the reports of this Society, as well as the work of individual members, been issued as Congressional publications. Much remedial legislation has been secured, many of the objectionable conditions have been removed, some have been improved and others should be.

In 1895 a law was passed regulating the milk supply of the District. The improvements of the facilities for the sedimentation of the water supply and the construction of the filtration plant were accomplished. These works have given splendid results. Yet many of our own citizens as well as strangers contemplating a visit or residence here do not seem to be aware of what has been done. It has been found that many still continue to boil the filtered water whether turbid or not; others contaminate it by persevering in the use of domestic filters, while still others purchase bottled waters, sometimes of questionable purity, not knowing their source nor the character of the methods employed at the bottling depots.

From the fact that there has not been a marked diminution in the prevalence of typhoid fever since the completion of the filtration plant and the removal of many of the city pumps, it has been found necessary to make additional studies as to its causes. On account of the lack of bacteriological laboratory facilities and

a sufficient number of inspectors, the Health Officer has not been able to fully make the required investigations. Fortunately representatives of several of the Government departments have cheerfully coöperated with members of the Society and other private citizens towards this end. The Bureau of Public Health and Marine Hospital Service issued in Bulletin 35, a special report upon this subject.

In the course of these inquiries much valuable information has been secured bearing upon other contagious diseases, including tuberculosis.

The contention made in the report of your Committee of 1894, that milk was a most potent cause of the continuation of the high rate of typhoid fever has been confirmed by these investigations. Through the courtesy of the Secretary of Agriculture, upon my request for the bacteriological examination of the water supply of dairy farms, one of the recommendations in the report of 1894, there will be presented conclusions based upon such examination of 350 farms. These show that many contained the colon bacillus. Immediate closure of water supplies so contaminated in the cities has been universally recommended. How much more is this danger augmented when such bacteria are found in the water supply of dairy farms? Polluted water readily contaminates milk, which contamination is rapidly increased by the multiplication of bacteria when the temperature is above 50 degrees Fahrenheit.

This contamination is a terrible menace when we recall the present knowledge as to the carriers of the bacillus of typhoid. This is especially so since it has been found from the official report of the State Board of Health of Maryland, that there were forty-two deaths from typhoid fever from January 1, 1905, to June 30, 1906, in the two counties, Frederick and Montgomery. From these a very large part of the milk supply of Washington is derived. We can readily infer that there were nearly five hundred cases of typhoid in these two counties during that period.

These are the considerations which prompted me to offer the resolution for the Society to arrange for this symposium.

It will be shown this evening that clear, absolutely safe water is furnished direct from the taps the greater portion of the year, that the slightly turbid and reasonably safe water can readily be made clear and absolutely safe; that the prevalence of typhoid

fever, diphtheria, scarlet fever and tuberculosis can be diminished, and that a marked diminution in the diseases and deaths of infants may be secured. This will be accomplished by furnishing the District Commissioners additional authority for the regulation of dairy products—milk, cream, ice cream and butter—a bacteriological laboratory and additional inspectors for the Health Department and by promptly authorizing the installation of the recommended facilities for the preliminary treatment of the Potomac water when turbidity and high bacterial counts prevail.

Many of the dangerous conditions at dairy farms could and would at a trifling cost be promptly remedied, were the farmers properly instructed by competent inspectors.

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## The Water Supply of Washington.

By SPENCER COSBY, Major, Corps of Engineers, U. S. A.

With a view to helping to a clearer understanding of the questions to be discussed this evening I propose to give a brief general description of the water supply system of Washington, of the methods used to improve the quality of the city water, of the results obtained, and of the experiments made to determine the best means of securing still better results.

The water supply of Washington is derived from the Potomac River at Great Falls, whence it is brought through the Washington Aqueduct to the Filtration Plant, a total distance of 16½ miles. Throughout the greater part of its length the aqueduct consists of a brick conduit, averaging nine feet in interior diameter, laid beneath the Conduit Road. It crosses the deep gully of Cabin John Creek over the well-known bridge of that name, until recently the longest masonry arch in the world. Forty-six hundred feet of the upper portion of the aqueduct consists, however, of unlined tunnels driven through hard rock, and the last four miles is in the form of a strongly-lined tunnel passing deep beneath the city and under Rock Creek, where it is 170 feet below the hydraulic grade, and so under strong pressure. Along the line of the aqueduct are three large reservoirs, through which the water must ordinarily pass before reaching the filtration plant. The relative positions of the different parts of the system are shown on the diagram. The three reservoirs have under normal

conditions a combined average capacity of 437,000,000 gallons, or about 6½ days' supply at the present average rate of consumption.

From the last of the three reservoirs the raw water is pumped direct to the filter beds, of which there are twenty-nine of the slow-sand type, having an effective filter area of one acre each, and entirely inclosed in concrete masonry. The filters contain, on an average, forty inches of filter sand on top of twelve inches of graded gravel, through which the water is usually passed at the rate of 3,000,000 gallons per acre per day, that is, it sinks through the sand with a vertical velocity of only 4.6 inches per hour. The filtered water is collected in the underdrainage system of the beds, carried to the regulator houses, which contain the necessary apparatus for governing the rate of filtration, and then flows into the covered pure-water reservoir, with a capacity of about 15,000,000 gallons, from which it is delivered into the city mains and distributed, either directly or by pumping, to all parts of Washington.

For over two years, that is, since October 5, 1905, when the filtration plant was first put into full operation, every drop of water taken from the city pipes of the District of Columbia, whether used for household purposes, or for putting out fires, or in the public fountains, or for watering parks and lawns, has been slowly and carefully filtered. In addition, it has been held back sufficiently long in each of three large reservoirs to give sedimentation a chance to do effective work in removing impurities, and care has further been taken not to allow it to be mixed with the Potomac water whenever the latter carried an unusual amount of suspended matter.

Experience has shown that it takes a little over four days for any of the water entering the aqueduct at Great Falls to reach the filter beds, though it is probable that most of it has taken about six days to get to these beds from the river. It is believed that about two days more are required for the process of filtration and for passing through the mains and pipes to the consumer, and that it has taken more than a day for the water to reach Great Falls from the nearest important possible source of infection (Frederick, Maryland), while it is estimated that the time of flow from the largest possible source on the watershed (Cumberland) is from four to seven days. It thus appears that about seven days is the least time in which water which has had

any chance of being seriously polluted can reach the consumer in this city, and that between nine and ten days is probably the average time, while the latter figure represents the shortest period in which such water can be brought to the consumer from the part of the watershed contributing about 80 per cent. of the possible direct pollution of the Potomac.

These delays, to which any seriously infected water is subjected on its way to the consumer, together with the natural purification and dilution which take place to a greater or less extent in the river, are certainly important factors that are always at work in improving the quality of our water supply. In addition to these there are not only the sedimentation and filtration already mentioned, but for the past two years the practice has been followed, except during spells of cold weather, of closing the inlet gates of the aqueduct at Great Falls whenever the turbidity of the Potomac exceeds 500 parts per million according to the Geological Survey standard. That this has resulted in shutting out many impurities that have heretofore entered the system is evident; in fact, it is estimated that during the last fiscal year it had the effect of causing a reduction of 42 per cent. in the total suspended matter in the water flowing into the first reservoir. If it were not for the limited storage capacity of the reservoirs, which greatly restricts the number of consecutive days during which the turbid water can safely be shut out, even better results could have been obtained.

The important part played by sedimentation in removing impurities from the system is shown by a comparison of the average turbidities, during the last fiscal year, of the water entering the aqueduct from the river and of that issuing from the last of the reservoirs; these turbidities were 79 and 29, respectively, giving an average reduction of about 63 per cent. The effect of sedimentation is shown even more strikingly by an examination of the results of the bacterial analyses that were made daily throughout the year of samples of water taken from each of the reservoirs. The maximum number of bacteria per c.c. found at the entrance to Dalecarlia reservoir on any day was 63,000, while the average for the year was 4,852. The maximum number at the outlet of McMillan Park reservoir (at the filtration plant) was 15,000, and the average 633. In other words, sedimentation alone caused an average reduction of 87 per cent. in the number of bacteria in our water supply.

That, in spite of its marked improvement, further purification of the water is needed before it can be considered safe for consumption, is shown by the figures I have just quoted, giving the bacterial condition of the water as it issued from the McMillan Park reservoir. An average bacterial content of 633 should certainly be reduced, if possible, and this was done most effectively by filtration, which brought the average down to 31, and at no time during the year allowed water to be delivered to the city containing more than 200 bacteria per c.c.

The efficiency of the various methods I have just mentioned, in improving the quality of the city water, can, perhaps, be best realized by summing up briefly, as follows, the results of the numerous daily analyses and tests made during the first two years the filtration plant was in operation.

During this period the highest turbidity of the river water at any time was 1,750, while that of the filtered water never exceeded 20; the maximum number of bacteria per c.c. found in any part of the aqueduct system was 175,000, the maximum number in the city water was never greater than 200, and exceeded 100 on only sixteen days. The average number of bacteria was 32, and this represents an average reduction as compared with the number entering the system of over 99 per cent. Out of 906–10 c.c. and 1 c.c. samples of water taken from the inlet to the system and tested for the presence of the colon bacillus, 45 per cent. gave positive results, while out of 3,418 samples of filtered and tap water only 96, or 2.8 per cent., gave positive results.

The various tests and their results, which I have just outlined in the most general terms, are, I believe, to be gone into more fully later by Mr. Longley, the chief chemist at the laboratory of the filtration plant. It is sufficient to state here that in watching over the purity of Washington's water supply, and in insuring the effectiveness of the methods used to secure it, three chemists are constantly employed in this laboratory. Tests for bacteria are made from samples of water taken daily from each of the reservoirs and from each separate filter, and taken weekly from house taps in various parts of the city; chemical analyses of samples from the different parts of the system are made weekly, and measurements of turbidity daily. In addition, experimental work is being constantly carried on. As a result of all this, not

only have we been enabled to keep close track of the exact condition of the water from day to day, but we have collected a vast amount of accurate and valuable data concerning it.

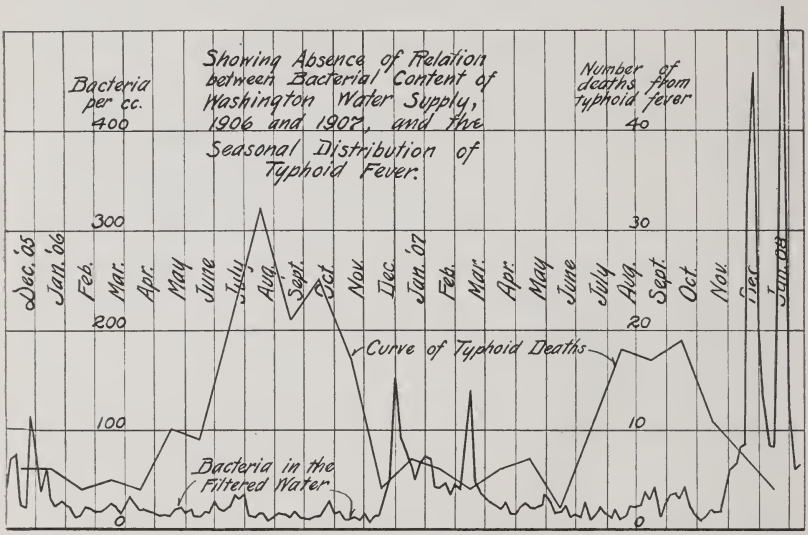
It may be mentioned incidentally here that the cost of the filtered water delivered by the aqueduct to the city pumping station is less than $5.00 per million gallons, and this includes every item of operation and maintenance (except interest on cost of plant) involved in bringing the water from Great Falls, filtering it, analyzing it, watching the system, repairing the Conduit Road, etc.

In giving statistics as to the results obtained I have purposely confined myself to the first two years of operation of the filtration plant, since these presented normal conditions and show what may be ordinarily expected. But last December, and again in January, there was a period of over a week during which unusual conditions prevailed ; the river water was excessively muddy (the turbidity reaching at one time the high figure of 2,100) for a greater number of days consecutively than usual, and this occurred at a season when the possibility of a cold spell made it unsafe to close the inlet gates for more than a few hours, and when both sedimentation and filtration are least effective ; moreover, during the whole of December, Dalecarlia reservoir was cut out of the system for repairs to its banks.

The wave of high turbidity was accompanied by a very high bacterial content, the daily average for December of the Potomac water being over 16,000 per c.c. The result was what has been predicted and expected since the start of the filtration plant. There was general complaint of the cloudy, brownish color of the city water during parts of the last two months, and our previous maximum bacterial content of 200 was more than quadrupled, rising on one day to 900 ; the average number of bacteria each month exceeding 190. Of course, such a state of affairs is objectionable, but it is probably safe to predict that as long as only the present natural means are used for effecting a partial purification of the river water before it reaches the filters, there will be periods each winter during which the filtered water will have a turbidity and a bacterial content comparing unfavorably with the excellent quality of the water delivered to the city during the warm months.

At the same time it is not believed that the deterioration in the

quality was sufficient at any time in the last two months to render the city water at all unsafe. The number of bacteria was not excessive when compared with the numbers frequently found in other cities, the supplies of which are considered excellent, and the presence of the colon bacillus was not indicated to an unusual extent. Moreover, the amount of typhoid in this city, as indicated both by the mortality and the number of cases reported, has shown a steady decrease since December; in fact, at no time since the filtration plant was put in operation has it been possible to detect any connection between the prevalence of typhoid and the quality of the water supply as indicated by the number of




bacteria. This is well shown by comparing the two curves which I have had prepared, the lower representing the variations during 1906 and 1907 in the numbers of bacteria found daily in the filtered water, and the upper the changes in the number of deaths from typhoid reported weekly. It will be seen that as a rule typhoid is most prevalent in the late summer and fall, when the city water is at its best.

Still, a water with a high bacterial count must be considered as below standard, and there are additional objections to the recurrence of the conditions of the past two months based on other than purely sanitary grounds. For one thing, the occasional coloration of the water breeds distrust in the consumer

accustomed to the clear water which is at other times supplied him, and for another it is feared that there will be a gradual accumulation of clay in the pores of the sand in the lower part of the filter, which will ultimately reduce somewhat the general efficiency of the plant. If it is possible to remedy these defects and obtain at all times a clear water containing only a small number of bacteria, the remedy should certainly be applied.

It must consist in some preliminary treatment of the water which will remove from it a larger proportion of the impurities than are now removed by purely natural means, and thus render the work to be done by the filters less heavy, less subject to sudden strain, and more thorough. To ascertain whether such a method could be found which would at the same time be economical and free from objectionable features, a series of experiments have been carried on at a small plant erected for the purpose near Dalecarlia reservoir. It comprises the two best known and most promising systems of rapid filtration and a coagulating plant and basin. With each of these three systems is connected a small sand filter built in exact imitation of those of the filtration plant. The three systems have now been operated for a full year, during which they have been carefully watched and daily turbidity and bacterial tests made. These have shown conclusively that neither of the systems of rapid pre-filtration is effective or can be depended upon to produce any decided improvement in either the turbidity or the bacterial content of the filtered water. On the other hand, the method of coagulation has proved itself capable of giving at all times a clear effluent containing only a small number of bacteria. This was most thoroughly demonstrated during the periods of strain of December and January, when the product of the coagulating system was the only one that remained constantly satisfactory both in appearance and quality.

Such a system could be installed in connection with the Washington aqueduct at a moderate initial cost, since it would involve only the erection of a small plant for storing, mixing and applying the coagulant, and the making of some changes in the Georgetown reservoir (the second of the series), to enable it to be readily and periodically cleaned of the deposits of coagulated material. The increase in the annual cost of the water supply would be slight, and the expense of applying the coagulant would, it is hoped, be offset in part by the reduced cost of operating the

filters, as they should require cleaning at less frequent intervals. It should be explained that it is the intention to apply the coagulant, which would probably be sulphate of alumina, to the water just after it leaves Dalecarlia reservoir, more than six miles distant from the filtration plant, before reaching which it would have to pass through both the Georgetown and McMillan Park reservoirs, in the former of which almost all of the coagulated material would undoubtedly be deposited. Experience, extending over many years in a large number of American cities, has shown that no injurious sanitary effect need ever be feared from the use of a coagulant applied to the water under reasonable and constant chemical supervision, such as would, of course, be employed in this case. The use of alum would be limited to the days, estimated to number from thirty to sixty a year, on which the water contained an excessive amount of impurities; there would be no increase in its hardness, the alum would disappear chemically, and the alumina, which may be regarded as the active principle of the coagulant, would be entirely removed in the course of purification; the city water should contain no more of it than if coagulation had never been resorted to. That this method of preliminary treatment of the water would be necessary was the opinion of the experts upon whose recommendation the system of slow-sand filtration was finally adopted.

It is not, however, our intention to adopt coagulation in any form without first securing the authorization of Congress; that this will soon be obtained is sincerely to be hoped. Though our experience of the past two years has shown that Washington is being supplied with good and wholesome water, it has also shown that it is possible to safeguard still further our water supply so that it shall be at all times unexceptionable both in quality and appearance.

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## The Washington Filters and the Quality of the Effluent Therefrom.

By FRANCIS F. LONGLEY,

Chief Chemist, and Assistant Superintendent, Filtration Plant.

For many years the problem of the relation between the quality of the public water supply and the health conditions, particularly the typhoid fever death rate, in the District of Columbia, has

been under the close scrutiny of the medical fraternity of this city. With the earlier consideration of this subject and the investigations and discussions that attended upon it, you are all more or less familiar. The object of this symposium tonight is to bring home to the members of this body, as the representative protectors of the public health, the facts in connection with this question that have been obtained in the studies that have been so vigorously prosecuted during the last two years.

The share in this presentation that falls naturally to my lot has to do with the sanitary quality of the water supplied to the city from the filtration plant.

The problem of the cause of typhoid fever in a community is very broad and very deep. It has always been a dread disease, for reasons that need not be set forth to a body of medical men. When years ago the relation was pointed out between polluted water supplies and typhoid fever, and emphasized by epidemic after epidemic of the most virulent nature, with the most convincing evidence to prove this relation, the dangers lurking in polluted water were preached far and wide; and in the light of the evidence adduced, the theory of water-borne typhoid was almost universally accepted.

This was right and proper. The facts in a great many spectacular outbreaks of typhoid fever have been so closely in accordance with this theory as to eliminate every doubt in its application to the case, in question. There is an element of danger however, in the too complete acceptance of this theory. There is danger of forgetting almost entirely that the disease may have its origin in many other causes. In their highly commendable enthusiasm over the application of this theory some of the ablest writers in the country on sanitary subjects have entirely ignored this possibility.

Since first it was recognized that Washington had a bad typhoid record, and the question of its origin was brought up, the public water supply—that is, the unfiltered Potomac water—was pointed to as one of the important sources, probably the principal one of all. From the evidence this was a natural conclusion. Bacteriological analyses had shown the presence of sewage organisms in the city water, though such analyses would hardly be necessary to prove that point if instead one could see the sewers of Cumberland and Hagerstown and other communities pouring

into the water which later flows past or into our intake at Great Falls. About nineteen years ago, too, a member of this very Society traced a well-defined relation between an epidemic of typhoid in Cumberland, and the subsequent appearance of the disease in unusual quantity here in Washington.

It was expected, therefore, that the purification of this public water supply drawn from the Potomac would cause a decided falling off in the amount of typhoid in the District. As this Society knows, there has been, during the two and a half years of operation of the filters, a great deal more of this disease than was consistent with the removal of the principal cause thereof; and the logical conclusion that is concurred in by all of the closest students of this problem is that we were mistaken in laying so heavy a burden of the blame upon the old muddy Potomac water. I have no intention of arguing that there was *no* blame attaching to it, but I believe, in the light of our present knowledge, that it will be very generally admitted that we blamed it too much, and attached too little importance to the many other possible factors that might cause the disease, even when attention was called loudly to them.

The fact that there was no reduction in the typhoid fever rate during the first year or more of operation of the new filters, however, had the effect of precipitating much unjustifiable and sensational criticism of the filtered water supply, and it is the desire of those who have interested themselves in the subject this evening to set the critics aright by presenting acceptable evidence to show that the filtered water is the best water available for domestic use, and is, or can be made, entirely above reproach. It is the desire, too, of those in charge of the operation of the filtration plant to so state their defence of the quality of the filtered water that they may not be open to the criticism of prejudice in its favor. And it is for this reason that I speak as I do of the theory of water-borne typhoid against its too general application, with the idea on the one hand of presenting the filtered water in a favorable light, and on the other of directing the attention of this body to the many other possibilities that may contribute to the persistence of this disease in the District of Columbia.

A description of the filtration plant was at first suggested, among other things, for this evening. But, on consideration, it seemed that a purely technical description, such as that would

be, would have but little bearing upon the real subject, and but little interest to most of you. For the benefit of those who have never seen the filters in detail,—and, by the way, there are altogether too many of you who should be most interested in them who come within that category,—a few of the most typical pictures will be shown to give a clear idea of the elementary structural features of the plant.

There have been very few criticisms of the design of these filters from the members of this Society. One feature has been criticised and I have been asked to answer the criticism. The depth of the gravel layer upon which the sand is supported is one foot. With the deeper gravel layers in some of the old filters in mind, fears have been expressed that a low efficiency might result from this. These fears, though, are unfounded.

In Kirkwood's plans for St. Louis filters more than forty years ago, he provided for 4 feet depth of gravel. The Berlin filters at Lake Tegal have 2 feet of gravel. The filters at Hamburg have this same depth. And there are others with depths of 2 feet or greater.

The functions of the gravel layers of a filter are to cover the underdrain piping system and support the sand layer, and to provide for perfectly free lateral movement of the water from all points of the floor to the underdrains themselves. The gravel has no purifying action. The only considerations, then, in determining the depth of the gravel are that it shall properly support the sand and conduct the water. Both these points are susceptible of mathematical computation. There is reason for believing that the two or more feet of gravel used in the older filters was simply the result of speculation, not of careful computation. And if this computation shows that a smaller depth of gravel will fulfill the functions equally well, there seems no logical reason for following the old precedent.

With these arguments in mind, engineers have for a number of years been making a very general practice of providing lighter gravel layers than the older ones above mentioned; and the one foot of gravel in our filters is entirely sufficient, and is not at all an extreme or unusual design.

A point that has been subject to some criticism is the rate at which the filters are operated. This is a question which has been discussed many times, and many isolated studies made upon

it, but for which no general rules of application can be stated. The facts indicate that a proper maximum rate depends upon the quality of the water to be filtered, and that waters but slightly polluted may be filtered at comparatively high rates with no appreciable decrease in efficiency. In the best of the old European filters the rates of filtration vary from 1.6 million gallons to 7.5 million gallons per day.

| | Rate in mil. gals. per acre per day. | Vertical depth of water filtered. Feet per day. | Inches per hour. |
|---|---|---|---|
| Hamburg, . . . . . | 1.6 | 5.2 | 2.6 |
| Best American practice, of which Washington is the type, . . . . . | 3.0 | 9.8 | 4.9 |
| Zurich, . . . . . | 7.5 | 24.5 | 12.2 |
| Rapid filtration, . . . . | 125.0 | 408.0 | 204.0 |

The rate very commonly used in American practice, and for which the Washington filters were designed, lies between these two extremes. In comparison it is interesting to point out the very high rate which is used with entire success on waters that have been artificially prepared for filtration by the action of coagulation.

The question as to whether or not the rate here used, 3.0 million gallons per acre per day, is higher than it properly should be, may be judged from the satisfactory character of the bacteriological results presented. In connection with this question of efficiency at different rates we have the results of experiments we have made, covering periods of six months or more, showing no decrease in efficiency even when the rate is increased 50 per cent. or to 4.5 million gallons per acre per day. .

| | 24 filters operated at rate of 3.0 mil. gals. per acre per day. | 5 filters operated at rate of 4.5 mil. gals. per acre per day. |
|---|---|---|
| Average number bacteria per c.c., . | 43 | 42 |
| Average turbidity in effluent, . . | 3 | 3 |

Of primary importance to medical men in the operation of the filters is information in regard to the bacteriological character of the filtered water. Data of this kind, like many others, are quite meaningless without some standard of comparison. A bacteriological standard for a potable water is necessarily an arbi-

trary one, and represents the judgment of those men who are best informed upon the subject. The Prussian official regulations prescribe 50 as the maximum number of bacteria allowable in one c.c. of the filtered water. The London standard is 100 bacteria per c.c. Opinions have been expressed by other authorities setting limits as high as 500 per c.c. In the light of our knowledge of bacteriology, we know it is impossible to set any limit that will clearly separate *good* water from *bad*. Instead I will present a table showing the classification of bacterial counts in the filtered water during 27 months of operation:

*Classification of daily Bacterial Counts in the Filtered Water Reservoir during the period November 1, 1905, to February 1, 1908.*

| *Bacteria.* | | *Number of days.* |
|---|---|---|
| Between 0–20 | per c.c. | 291 |
| 20–40 | per c.c. | 245 |
| 40–60 | per c.c. | 63 |
| 60–80 | per c.c. | 30 |
| 80–100 | per c.c. | 28 |
| 100–200 | per c.c. | 29 |
| 200–300 | per c.c. | 13 |
| 300–500 | per c.c. | 5 |
| 500–1000 | per c.c. | 5 |

The average bacterial content of the filtered water has been, for fourteen out of the twenty-seven months, not in excess of 20 per c.c. and this should to a certain degree indicate a standard that may be reached under proper conditions, and that we should make every effort to reach all the time. Please keep these facts in mind, as they have a bearing upon something I wish to say later on.

More significant than the reduction of numbers of bacteria in the process of filtration is the exclusion, more or less complete, of sewage organisms. It is entirely unnecessary to point out to the members of the Medical Society the significance of the presence of the common sewage organism known as B. Coli. Sufficient to say that the removal of bacteria of which that is a type, and of which, in laboratory technology, that is the best known indicator, is the fundamental function of a filter. The table shows the removal of B. Coli, and the fact that it is found present in only 1.5 per cent. of the 1 c.c. samples in a period of two years speaks well for the sanitary quality of the water, surely.

*Summary of Results of Examination for B. Coli (26 months).*

| | Number samples examined | Number positive in 10 c.c. | Per cent. positive in 10 c.c. | Number positive in 1 c.c. | Per cent. positive in 1 c.c. |
|---|---|---|---|---|---|
| Potomac water, unsedimented..... | 453 | 240 | 53. | 169 | 37. |
| Potomac water, 4 to 5 days sedimentation | 671 | 198 | 29.5 | 80 | 11.9 |
| Filtered water,..... | 672 | 29 | 4.3 | 10 | 1.5 |
| Tap water,..... | 1,079 | 53 | 4.9 | 12 | 1.1 |

*Number of months Coli not found in*

| | Total number of months. | 10 c.c. | 1 c.c. |
|---|---|---|---|
| Filtered water, ..... | 26 | 11 | 21 |
| Tap water,..... | 22 | 6 | 16 |

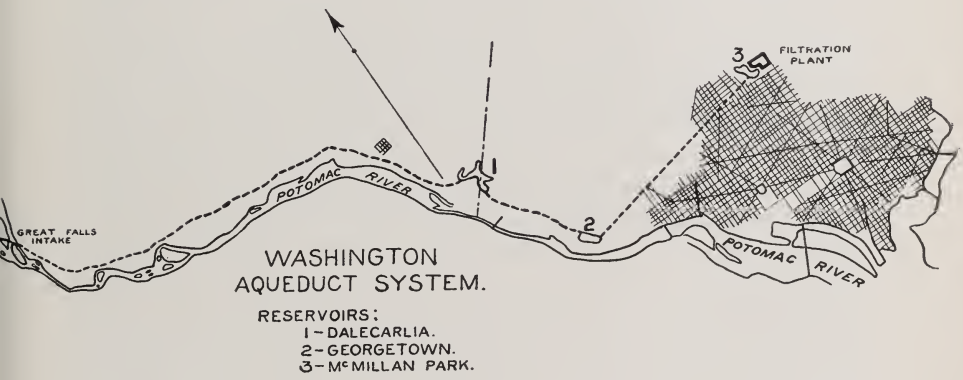
The bacterial condition of the filtered water is, of course, the best criterion of its sanitary quality. Besides bacteriological examinations, however, we make chemical analyses at regular intervals, and also physical and microscopical examinations, and keep as familiar as possible with all phases of the condition of the water at all points from the Potomac River to the consumer.

In all these examinations we follow the methods laid down by the American Public Health Association, in the comprehensive report made on the subject of water analysis by the laboratory section of that body.

I want to speak briefly upon a question of faith which concerns the members of your Society in connection with the subject under consideration. When the filters were first put in operation, more than two years ago, and especially during the following summer of 1906, when there was so much typhoid in the city, there was an undeniable feeling of distrust in your ranks of the work we were trying to accomplish. And through you, as the guardians of the public health, it made itself felt among the laity. I do not mean to deprecate the caution that is so truly advisable in a question like this, but I do wish to enter a plea for closer acquaintance and greater familiarity of the doctors of the District

with the work being done at the filtration plant, in order that they may more truly appreciate it and that their judgment thereof may not be distorted because of an inexcusable ignorance of the subject. It is to be hoped that this meeting will dissipate any remaining feelings of distrust, and that it will stimulate an interest in the subject of filtration that will prove of value to all.

Now I want to point again to the bacterial results from the filters. They have been good, as I said. In comparison with the results of filtration at some other places they have been excellent. But they have not been perfect. There are times when unusually bad conditions prevail in the unfiltered water, when there is very plainly room for improvement. These occasions may be seen from this diagram. Natural factors controling the




condition of water in the river, the efficiency of the sedimentation process in the reservoirs, and the efficiency of filtration, make it an assured fact that these high bacterial counts will recur in greater or less degree each winter that passes, with only the means we now have at hand for controling them. In pointing out this fact I wish to emphasize what Major Cosby has said in regard to the absence of any relation between these high counts and the typhoid fever curve. Just what the significance of these high numbers of bacteria may be cannot be stated ; but with the desire to make the water supply of Washington not simply "good," but unqualifiedly "the best," does it not seem wise to put our best foot foremost in trying to eliminate in the future the periodical recurrence of these periods?

Major Cosby has referred briefly to the proposed plan of apply-

ing a coagulant to the water during the periods of extreme condition in the river. This proposition is not new. No doubt the majority of the members of this Society remember well that this question has been discussed before. The final note of the controversy was sounded in the report of three of the foremost sanitary engineers in the country, in which they concluded :

"In consideration of the full evidence we recommend the construction of a complete system of slow-sand filters, with such auxiliary works as may be necessary for preliminary sedimentation and the use of a coagulant for part of the time."

When the filters were built, however, provision for the preliminary coagulation was purposely omitted, on the understanding that it could be installed later, if desired.

The idea of putting a chemical into the public water supply met from the very first with a natural opposition. It was proposed, however, not as a proprietary process out of which some one was to make himself rich, not by the persons interested in the manufacture and sale of chemicals, but by engineers who had studied the question thoroughly in all its phases and who knew, these several years ago, that coagulation as an occasional preliminary treatment *would* give results beyond criticism, and that no other known method *could* do this with the Potomac water at Washington.

The results of our added knowledge of the past few years, and especially the results of a year of careful experimental work on this problem, have simply confirmed that attitude of the engineers. And in view of this, and of the desirability I have pointed out of improving the condition of the water at certain periods, this whole question is brought up again in this way.

The active agent in the process of coagulation as here proposed is aluminum hydrate. This is formed upon addition of the aluminum sulphate solution to the water to be treated. The incipient formation of the aluminum hydrate takes place everywhere throughout the mass, that is, assuming a thorough mixing when the solution is added. As the action goes on, there is a progressive increase in the size of the flocculent, insoluble particles, with a tendency to include in these growing masses the fine suspended matter in the water. It is probable, too, that this agglomerating action takes place first of all upon the very material which, on account of its extreme fineness, is most difficult to affect by other means.

The result of this action is a mass of particles which, both chemically and mechanically, are quite stable. They are made up of aluminum hydrate, clay and other turbidity-producing material, bacteria, microscopical organisms and perhaps other impurities from the water. They are large enough to be easily visible to the naked eye, and to be removed by a simple straining action. Their hydraulic value is great enough that they may be removed in large part by sedimentation. They are suspended in the treated water, which otherwise is now crystal clear and much reduced in bacterial content.

This water is now subjected to prolonged sedimentation, and then goes to the filters, carrying but a little of its original burden of impurities, and these in a form to be easily and thoroughly removed. The effect of this treatment, too, will be to remove every trace of color and turbidity in the water that is visible to the ordinary consumer, such as we have had in very marked degree at times during the last two months. This, however, is mainly of esthetic importance, and therefore I make only this brief mention of it.

What is objected to in the use of aluminum sulphate? To answer this question it is desirable to set forth a statement of the chemical action of coagulation.

All natural waters contain salts in solution extracted from the rocks over or through which they have passed. Very commonly the carbonates of calcium and magnesium are present. From the chemical standpoint this solution is a relatively stable chemical "system."

If a solution of aluminum sulphate be added to this "system" its stability is at once destroyed and a definite rearrangement takes place to bring it into equilibrium again. The conventional representation by chemical formula of the changes that take place is simple. Briefly, these changes are are as follows:

(1) Part of the carbonates of calcium and magnesium are changed to sulphates of the same bases.

(2) Some carbonic acid gas, resulting from the decomposition of the carbonates, is set free.

(3) The aluminum becomes aluminum hydrate, which is the effective agent in the process.

(4) There is a limit, depending upon the quantity of carbonates in the water, to the proper quantity of coagulant to apply.

If the quantity applied be within this limit, the above changes take place and no *aluminum sulphate is present in the water* when the new state of equilibrium is established.

(5) If the quantity applied be above this limit, the water will exhibit the acid qualities typical of the applied solution.

Considering the hygienic effect of these different chemical changes, let us take them up one at a time.

(1) *Increase in quantity of sulphates of calcium and magnesium.* —The maximum increase in quantity of these sulphates in the effluent of sand filter, No. 3, at the experimental filter plant, which was the filter to which coagulated water was applied, during the eleven months of operation, was 21 parts per million. The average increase would probably be 12 to 15 parts per million during coagulating periods.

Analyses of a number of commonly-used mineral waters, by the Bureau of Chemistry, Department of Agriculture, show quantities of these substances, as follows:

| | Parts per million of calcium and magnesium sulphates. |
|---|---|
| French Lick springs, | 31,292 |
| Veronica water, | 14,896 |
| Bedford mineral water, | 2,330 |
| Geneva lithia water, | 2,075 |
| Tate Epsom water, | 1,918 |
| Berry Hill water, | 1,910 |
| Mt. Clemens water, | 778 |
| Buffalo lithia water, | 495 |
| Sheboygan water, | 419 |
| Arondack water, | 254 |

In the light of the fact that these are generally used, and many of them in the District of Columbia, and are frequently prescribed by physicians, there is no valid argument that 21 parts per million, or less, of these substances will work any harm on the public health.

Another point that may be mentioned here related to this change of carbonates to sulphates, though not one affecting the public health, is that of the hardness of the water. It is commonly thought that aluminum sulphate increases the hardness. It does not do this. It does change the form of part of the hard-

ness from carbonates to sulphates, as I have indicated above, but there is nothing inherent in the process of coagulation to cause an increase in the total amount. This statement may be substantiated by data obtained at coagulating plants in which tests for the soap-consuming power of the water, made both before and after the application of the coagulant, show no increase whatever in the total hardness.

(2) *Increase in quantity of free carbonic acid gas in the water.*—The quantity of this gas set free in water by the action of a coagulant is small, and entirely insignificant in comparison with the quantities in soda waters, Vichy, Apollinaris and other charged waters sold in every community without restraint.

(3) *Aluminum hydrate.*—This substance is a neutral, entirely inert solid, and is removed to the last trace by passage of the water through the filters.

(4) *No aluminum sulphate present in water if proper limit not exceeded.*—This is a chemical fact that needs no demonstration. Aluminum sulphate cannot exist as such in solution, in the presence of an excess of dissolved carbonates. The changes already mentioned take place and the above discussion applies.

In no one of the four points thus far brought up is there any ground for fear of the effect of use of aluminum sulphate upon the public health.

(5) *Presence of aluminum sulphate in water if limit is exceeded.*—This fact is evident, and is the only valid ground for objection to the process. If the proper limit is exceeded and aluminum sulphate in solution reaches the consumer, then the question of its effect upon the system is pertinent. Perhaps it might have a deleterious effect, though there is no specific information to show it. The best information we have on this point is the general health of the 2,500,000 people in the United States who drink water purified by coagulating processes. Even though in many cases the process has been shamefully neglected and abused, there is no authentic case on record of aluminum sulphate in a municipal water supply working any harm to the community. This discussion, however, will be confined to a statement of the limiting conditions above referred to and the small probability of their being exceeded.

The application of aluminum sulphate at the rate of 100 pounds of 17 per cent. sulphate per million gallons of water causes the

decomposition of 6 parts per million of the dissolved carbonates of calcium and magnesium. From this definite relation the maximum allowable quantity of the coagulant for the most adverse conditions may be determined from the minimum quantity of dissolved carbonates ever found. This minimum quantity of carbonates, from daily analyses covering a period of more than two years, is 31 parts per million. The maximum allowable quantity of aluminum sulphate, therefore, for this critical period of low carbonates, is 516 pounds per million gallons. The highest turbidity that has reached the proposed location for the coagulating plant during the two years that the gates have been manipulated for the exclusion of high turbidities, was 500. The quantity of aluminum sulphate necessary for proper coagulation of this turbidity of 500 is 360 pounds per million gallons of water. In other words, the maximum allowable quantity of aluminum sulphate, under the most adverse conditions that have been observed, is 43 per cent. more than is necessary for the proper coagulation of the worst water we have had in two years of operation under present conditions. This seems a generous margin for possible error. The fact must be emphasized, too, that the above statement applies only to the *most unfavorable* combination of conditions that have been observed, and the probability of their frequent and simultaneous occurrence is very small. Every improvement in the conditions controling this limit increases the margin for error on the side of safety, which for average conditions would be about 250 per cent.

From the above facts it is believed that there are no grounds whatever for fear that any undecomposed aluminum sulphate will ever find its way into the filtered water. At a number of efficiently operated coagulating plants, where conditions fix the minimum margin for error even lower than that stated above, it has been demonstrated by daily analyses covering long periods of time, that this can without question be properly controlled. Furthermore, under conditions that require an amount of coagulant in excess of the proper limit, it is customary not to permit the undecomposed sulphate to go into the filtered water, but to apply a small quantity of carbonate sufficient to entirely eliminate it. The question of the deleterious effect of small quantities of aluminum sulphate in the water is, therefore, entirely without our consideration.

There are now among you, a number who have a thorough understanding of what is proposed, and what the results of this treatment would be, and they stand ready to advocate it. And I only hope that all, whether of the Medical Society or of the laity, whatever their opinions in the past, may look upon this now in the spirit in which it is presented, as an added improvement to our water supply which will put it on a plane by itself among municipal supplies in this country.

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## The Causes of Typhoid Fever.

By M. J. ROSENAU, M. D.,

Director Hygienic Laboratory Public Health and Marine Hospital Service.

Washington, D. C.

The subject assigned to me in this symposium is entitled "The Causes of Typhoid Fever." In the narrow sense, there is only one cause of typhoid fever—the typhoid bacillus. I assume that Dr. Magruder intended me to speak of the causes of the spread of the infection of typhoid fever in the District of Columbia. With this understanding I shall discuss the channels of infection under four heads:

1. Water:
   - (*a*) Potomac river water,
   - (*b*) Shallow wells,
   - (*c*) Bottled waters.
2. Milk.
3. Contacts.
4. Imported cases.

1. Water.—It is a pleasure to confirm the statements made by Mr. Longley that during the past summer, which includes the typhoid fever season, namely, from May to September, the filtered Potomac River water supplied the City of Washington was of good quality from a sanitary standpoint. Daily bacteriological examinations made in the Hygienic Laboratory of the Public Health and Marine Hospital Service showed that it contained very few bacteria per cubic centimeter and practically no colon bacilli. In other words, the operation of the sand filters last summer was exceptionally efficient. Nevertheless, there were 670 cases of typhoid fever all told during that period.

A study of the sand filters will convince anyone of the high degree of engineering skill and ingenuity with which they were designed and the intelligence with which they are managed. The filters are fulfilling their mission ; they are doing all that slow-sand filtration can possibly do with water of the character of Potomac river water. It was well known before the filters were built that slow-sand filtration alone could not render the Potomac river water clear and give an entirely satisfactory effluent at all times throughout the year.

To obtain an entirely satisfactory water at all times some preliminary treatment is necessary. Two propositions have been suggested : Either the occasional use of alum in the water or increased storage. Personally, I have no objection to the occasional and proper use of alum as a coagulant, but favor increased storage capacity. A large subsiding basin would cost considerable money, but would fully repay the expenditure. Storage is the "natural" method of purifying water, in that it is automatic. From a sanitary standpoint storage is one of the best means of purifying water ; the pathogenic micro-organisms die a natural death and the organic matter is oxidized. I understand that it would require a large basin to permit of about twenty days' additional available storage in order that the intake may be closed when the river water is very turbid. In addition to the sanitary reasons, increased storage is recommended from the standpoint of prudence and safety ; in a large city like Washington only six or seven days' reserve supply and only one conduit are hazardous, for it provides no factor of safety against accidents or unusual demands.

It is evident, from what has been said, that the water last summer could not be held responsible for the spread of the infection. There were about 200 fewer cases of typhoid fever in the summer of 1907 than in the summer of 1906, and while this decrease may be attributed to the increased purity in the water supplied the city, there are other factors which indicate that the water played little part in the improvement in the situation. It would take us too far afield to discuss this problem pro and con in the brief space of time allotted me tonight. In fact, the proof of the exact part played by the Potomac river water in the spread of typhoid fever in the District of Columbia in previous years will depend upon the results of careful study of the

subject during the next three to five years. Washington may now congratulate itself for, so far as its general water supply is concerned, we are on the high road to a satisfactory solution of this important public health problem.

*Shallow wells.*—Based upon the recommendation of the Typhoid Board, the Commissioners of the District of Columbia last summer closed all but a few of the shallow wells used by the public. While no cases of typhoid fever could be traced directly to the use of the water from these wells, the bacteriological and chemical examinations showed them to be polluted. In fact, it did not require scientific laboratory work to demonstrate that the ground water in a densely-populated area, with miles of sewers—many of them broken and leaky—and with polluted soil from many sources, must at times be injurious to health.

*The bottled waters.*—Our investigations of the bottled waters sold in the District of Columbia show fraud and deception rather than unwholesome water vended. For instance, filtered tap water to which salts had been added was sold as "rock spring lithia water" or "blue label Wiesbaden sprudel water." Water pumped from a shallow well was bottled and labeled as "spring water" of crystal character of the purest and most healthful kind, whereas chemical and bacteriological examinations of this water gave evidence of sewage pollution.

2. Milk.—From our studies on typhoid fever in the District of Columbia* it now seems that market milk is a more dangerous fluid than the Potomac river water was generally supposed to be before it was filtered. Our studies clearly show that fully 11 per cent. of the cases in 1906 were due to infected milk, and that about 9 per cent. of the cases last summer were similarly caused. These percentages are based upon the number of cases actually traced to infected milk. Doubtless more cases than the figures indicate were due to milk. How many more were so transmitted it would be merely guess work to say.

The milk sometimes becomes infected on the farm, sometimes in the city dairy and sometimes at the corner grocery. At these little shops cases of typhoid fever are treated in one room and the milk retailed in an adjoining room; the same hands that sell

* "The origin and prevalence of typhoid fever in the District of Columbia," by M. J. Rosenau, L. L. Lumsden and Joseph H. Kastle; including articles contributed by Ch. Wardell Stiles, Joseph Goldberger and A. M. Stimson. Hygienic Laboratory Bull. 35, February, 1907.

milk nurse the sick ; flies swarm in and out, and the chances of spreading the infection must be very great. A clean and safe milk supply through inspection, sanitary surveillance and education is the the ideal to be sought, but it will take many years to achieve this consummation so much to be desired. In fact, it means a revolution of the entire dairy business. In the meantime we must protect ourselves by killing the infection in the milk by means of pasteurization. I am fully convinced—and in this my colleagues agree with me—that the pasteurization of the general market milk supply at a temperature of 60 degrees C. for 20 minutes would very materially diminish the amount of typhoid fever in the District of Columbia.

There can be no more objection to the heating of milk used for adults and children over three years of age than there is to the cooking of meat. Pasteurization would not only prevent the spread of much of the typhoid fever, but would also diminish the amount of tuberculosis, scarlet fever, diphtheria, dysentery and infantile diarrheas. For infant feeding, milk certified to be clean and pure need not be pasteurized.*

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3. Contacts.—Our studies in 1906 traced about 7 per cent. of the cases to contact with other cases ; last year about 19 per cent. of the cases obtained their infection from contact with other cases. We therefore again have definite proof that typhoid fever is directly communicable from the sick to the well. In fact this has long been known and recognized in Germany to such an extent that there a typhoid fever case is isolated and treated as a dangerous contagious disease.

This gives us our cue for one of the most important and practical measures to prevent the further spread of the infection : every case of typhoid fever, every case of suspected typhoid fever and every case of continued fever until the diagnosis is settled should be treated as typhoid fever, isolated, and disinfection practiced so as to prevent the spread of the infection. If these measures are conscientiously and aggressively carried out they will largely diminish the amount of the disease in this or any other city. We must learn that a case of typhoid fever may be just as dangerous to a community as a case of smallpox, scarlet fever or cholera. The discharges should be disinfected as they

* For further discussion on this subject, see article on pasteurization, by M. J. Rosenau, in Hygienic Laboratory Bull. 41, " Milk and its relation to the public health."

leave the body and before they have a chance to contaminate the environment.

4. Imported Cases.—In 1906 about 15 per cent. of the cases were imported; last summer about 25 per cent. of the cases were imported. By "imported" cases we mean, of course, cases which receive their infection outside the District of Columbia. To offset these imported cases probably an equal number of persons received their infection in the District of Columbia but had the disease elsewhere. Little need be said concerning the importation of cases except to emphasize the importance of isolation and disinfection, and the use of other measures now well known, to prevent the spread of this infection.

In Summing Up, the Typhoid Fever Board, in its studies last summer, was able to account for about half the cases of typhoid fever in the District of Columbia. This is no mean showing and needs no apology. To account for half the cases of a disease presenting so many difficulties is, in fact, very encouraging. It really means that the channels of infection of the bulk of the cases are now accounted for.

To conclude: There are three principal sources of infection: (1) Imported cases, (2) infected milk, (3) contacts.

The problem of preventing the further spread of typhoid fever in the District of Columbia now narrows itself down and is made comparatively plain. By improving the milk supply, especially by pasteurization and by treating the disease as a strictly contagious one, typhoid fever will practically disappear from the District of Columbia, as it has from certain large European cities where similar measures have been practiced.

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## Dangers of Domestic Filters, Water Coolers and Ice Cream.

By HARVEY W. WILEY,

Chief of Bureau of Chemistry, Department of Agriculture.

In presenting a few facts concerning the possibilities of transmitting diseases by means of domestic water filters, water coolers and ice cream, I desire to summarize and present to the Medical Society the results of certain investigations which have been made, under my direction, on these important matters in the Bureau of Chemistry.

The investigations made were chiefly of a bacteriological nature, and the work was done and reports made by Dr. Stiles, bacteriological chemist of the Bureau of Chemistry.

The points which were brought out in the investigations were the following :

First. The bacteriological condition of the city water as delivered at the points of consumption, in this case, chiefly, the Bureau of Chemistry.

Second. The bacteriological examination of the ice used very frequently in contact with the water.

In the pursuit of this examination some of the wells which were used by members of the Bureau were examined to determine the number and character of bacteria present. In addition to the bacteriological examination a sanitary examination was also made in several cases. This was done under the direction of Dr. J. K. Haywood, of the Bureau. In wells 60 feet deep, used as a source of water for one of the ice companies, a number of determinations made on the 2d of February, 1908, showed no bacteria at all. In surface wells used by members of the Bureau the lowest number of bacteria found per cubic centimeter was 15, and the highest 1,175. In one instance, from a well water which contained a total of 302 organisms per cubic centimeter, the colon bacillus was isolated.

Distilled waters which were used were also examined. The highest number of bacteria found in distilled waters was on the 4th of February, 1908, namely 200 organisms per cubic centimeter, and the lowest number found was 1 organism per cubic centimeter. In one instance the organisms in the distilled water produced gas.

*Composition of the hydrant water.*—The hydrant water from the city as delivered to the various parts of the Bureau of Chemistry, was examined at intervals, beginning on the 23d of August, 1907, and ending on the 5th of February, 1908. The highest number of bacteria found in the hydrant water during the period was on the 4th of February, 1908, namely, 42 per cubic centimeter. The lowest number was found on the 9th of August, 1907, namely, 9 per cubic centimeter. Gas-forming organisms were found in only two instances, namely, on October 2, 1907, and on February 4, 1908.

Artificial ice was also examined from different sources, sup-

posed to have been made from sterilized water. In one instance ice was found to contain no organisms at all. The highest number found in any case was 10 per cubic centimeter, and the lowest, except the one that contained none, 1 per cubic centimeter.

From the above data it is seen that the number of organisms in the filtered water as it runs from the taps is very low. Such a low number of organisms could not be regarded, it seems to me, as indicating any dangerous infection, although it is possible that some of them may have been of a pathogenic nature. In more detail, I may say that in a number of duplications of the work on the same sample of water taken from the tap the highest number of bacteria per cubic centimeter was 20 and the lowest 8, the average number of the four tests on the same sample being 14 and 12. The average number of organisms per cubic centimeter was 12.4. The tap water was now passed through a freshly-installed and sterile filter in the Bureau of Chemistry to determine what effect would be produced upon the tap water by another filter. In another determination where duplicates were made on the same sample, the highest number found was 11 and the lowest 2, showing an average of 7 bacteria per cubic centimeter. In another determination of a sample in duplicate, the highest number found was 8 and the lowest 1, an average of 4 per cubic centimeter. In still another examination in duplicate the highest number of bacteria found was 10 and the lowest 1, an average of 5.3 per cubic centimeter.

It is seen from the above data that by passing the city water directly through a freshly-prepared small filter in which the filtering medium was porous clay, the average number of organisms per cubic centimeter was reduced by about half. According to an exact calculation the total number of organisms was reduced 55 per cent.

One of the most interesting results of the examination was that relating to the condition of the coolers themselves. Having shown that the tap water was reasonably free from bacteria, it was deemed advisable to see how much contamination would take place in the ordinary method of keeping water in coolers into which ice is introduced. A large number of samples of commercial ice was examined, including both natural and artificial. The highest number of organisms found in natural ice was 856 per cubic centimeter. Of the thirty samples of water examined from the different coolers

used in the Department of Agriculture, all were found to contain organisms in large numbers. The largest number found was 4,500 per cubic centimeter. Some of the other numbers will be interesting: 450, 255, 510, 100, 1,475, 2,500, 60, 120, 75, 725, 640, 1,250, 525, 2,800, etc., etc. Some of these samples of water were refiltered through local filters after being drawn from the tap, and examinations of these showed in many cases that the refiltering was the cause of contamination; for instance, in one case the comparison of the water direct from the hydrant and of the refiltered water showed that the latter contained four times as many organisms per cubic centimeter as the former. This condition of affairs generally occur in filters which are not properly cared for, and after they have been impregnated with bacteria the last filtration, instead of diminishing the number of bacteria in the water, actually increases it by the addition of the bacteria which are constantly developing within the filter itself. Dr. Stiles, in making his report to me, added:

"When not properly cared for the average water filter is a dangerous thing and worse than useless, because it furnishes a supposed freedom from danger, when it really adds to the source of infection."

Another point which is brought out in this examination of the water supply should be accentuated, namely, the extreme danger of placing artificial ice, in contact with water. There are two reasons for this. In the first place, water should never be drunk as cold as ice, especially in summer time. The proper temperature for drinking water should not fall much below 60 degrees at any season of the year. The placing of the ice directly in the water naturally results in reducing the water approximately to a temperature of 32 degrees, and thus injury is done by pouring into the stomach water at this temperature. But there is another danger which must also be considered in this respect, unless the ice is a sterile ice, made artificially from sterilized water, either distilled or sterilized in some other way. Natural ice, no matter where it comes from, is always found to contain large numbers of bacteria. The water from which the ice is formed naturally contains bacteria, and after the ice is formed accretions in the number of bacteria are due to the contamination from the air, from persons passing over the ice for cutting it, or otherwise, so that it becomes, to a certain extent,

an infected article. A safe rule to follow is never to put natural ice into water which is to be directly consumed, and a better rule is never to put any ice of any kind into drinking water, but to arrange it so that the temperature is reduced not much, if any, below 60 degrees. The artificial ice which is examined is often found to be entirely sterile, and probably is altogether sterile at the time of making, but it may become infected later, though not to such an extent as any natural ice. There was not much uniformity found in the various bureaus of the Agricultural Department in the handling of the water. Sometimes artificial ice was supplied, sometimes natural ice, and in most cases both kinds, when used, were placed directly in the water. The result was that the cooler itself became infected, and when good water was used and artificial ice added, the bacteria which were adhering to the cooler were sufficient to contaminate it by increasing the number of organisms enormously, as has been indicated. Thus the benefits which resulted from the use of artificial ice were neutralized by the condition of the filter itself.

The general result of the examination of the coolers and of the extra filtration, leads us to suppose that on the whole the drinking water used in the various parts of the Department of Agriculture is not suitable for consumption. It is subjected to contamination which can easily be avoided by properly sterilizing the water holders from time to time, best, of course, every day, and by using either distilled water or city water and not bringing it in contact with the ice. And what is true of the water service of the Department of Agriculture will probably be found true of every other water service in every public building which has not already been examined and the methods of procedure reformed. When we consider how easy it is in this city at the present time to secure drinking water which is practically free from suspicion it seems strange that we would court the danger of infection by carelessness in the handling of the supply of water which, as indicated above, is reasonably pure. It can hardly be said, it seems to me, that the city supply of water, which, perhaps, does not contain on the average more than 15 to 20 organisms per cubic centimeter, can be regarded as dangerous to the health. While there is a possibility of danger, I will admit, in a water containing so small a number of organisms, it is very remote. It seems to me, therefore, that at the present time we cannot prop-

erly ascribe the typhoid fever which is found in Washington to the water supply unless that supply is contaminated after it is drawn from the hydrants.

From the above data, however, it is readily seen how easily this contamination can and does take place. The principal source of infection to which the city water supply is subjected after it is drawn from the hydrants is in placing it in coolers which are themselves unsanitary, and in its being treated with ice which is in itself unsanitary. If these two forms of contamination are eliminated it seems to me the water supply of Washington, as it comes today from the hydrants and from the filter beds, can be recommended without much fear as a wholesome beverage. Attention, perhaps, should be called in this matter to the fact that there may still be lingering germs of typhoid fever in the water mains, and I am not trying to close my eyes to the possible danger of infection from this source. My purpose, however, is to call attention to the fact that the city water supply, as indicated by our examination, is at present in a very satisfactory state.

Ice Cream.—A large number of investigations have been made during the past 18 months in respect to the ice cream of the District of Columbia and also of the States. These studies have been undertaken for the purpose of determining, if possible, a proper definition of ice cream, the sanitary conditions which surround its preparation, and the character of the materials from which it should be made. A few of the results of these studies are appended as illustrative of the character of the work which has been done. The data are both chemical and bacteriological and are of great interest in showing the actual condition and character of the ice cream supplied to customers in the District of Columbia. The results of the determinations are extremely favorable as respects the chemical constitution of ice cream, but distinctly unfavorable as respects the bacterial flora which the ice creams contain. It is evident that there is room yet for great improvement in this District, although there is reason to believe that in many respects the general supply of ice cream is superior in quality, so far as chemical constituents are concerned, to that of many other places. The chemical data were determined by G. E. Patrick, and the bacteriological data by M. E. Pennington and G. W. Stiles of the Bureau of Chemistry.

The total number of samples examined was 132, including one

double cream excluded from the averages. The average percentage of fat therein was 19.09. By act of Congress the legal standard of fat in cream for the District of Columbia is 20 per cent. The number of samples at or above 20 per cent. was 44, or 33.58 per cent. ; the number below 20 per cent. was 87, or 66.41 per cent.

These data show that only one-third of the samples of cream purchased complied with the legal standard for the District. The standard for fat in cream, established by the Secretary of Agriculture under authority of Congress for the country at large in so far as interstate commerce is concerned, is 18 per cent. The number of samples examined which were found at or above 18 per cent. was 82, equivalent to 62.6 per cent. of the total number ; the number below 18 per cent. was 49, or 37.4 per cent. of the whole number. The summary of the chemical data shows the total number of samples analyzed to be 228. Judged by the standard of 14 per cent. of fat for the ice creams of the vanilla type and 12 per cent. for those of the fruit type, it was found that there were at or above standard 117 samples, or 51.32 per cent., and below standard 111 samples, or 48.68 per cent. The average percentage of fat in the entire 228 samples was 12.67. Only 46, or 20.18 per cent. of the whole number of samples, contained less than 10 per cent. of fat, and only 25, or 10.97 per cent., contained less than 8 per cent.

The total number of samples containing a thickener was 80, or 35.18 per cent. In 33 samples, or 14.47 per cent., the thickener was gelatin, while in 47 samples, or 20.61 per cent., the thickener was a vegetable gum or starch. Only 2 samples were found to contain coal-tar dye.

Between October 13, 1906, and July 29, 1907, 263 samples of ice cream, collected in the City of Washington, were investigated as above outlined. That the bacterial flora in the majority of these ice creams was numerically enormous may be gleaned from the following summary :

Samples showing less than 100,000 organisms per c.c., 0 ; from 100,000 to 250,000 organisms, 2 ; 250,000 to 500,000, 3 ; 500,000 to 1,000,000, 14 ; 1,000,000 to 2,000,000, 23 ; 2,000,000 to 5,000,000, 34 ; 5,000,000 to 10,000,000, 50 ; 10,0000,000 to 25,000,000, 64 ; 25,000,000 to 50,000,000, 42 ; 50,000,000 to 100,000,000, 15 ; above 100,000,000, 16.

A study of the individual results from which the above summary was made shows that the average number of organisms per c.c. was 26,612,371. The maximum count obtained was 365,000,000, the minimum 137,500 per c.c. Of the total number of samples, 71.1 per cent. showed the presence of gas-producing organisms when 2 per cent. dextrose fermentation tubes were inoculated with 0.01 c.c. of the sample.

Reports on the presence or absence of streptococci have been made on 115 of the above samples; 38.3 per cent. of this number showed the presence of the organism, and 61.7 per cent. of the samples examined failed to show it when tested by the method above described.

During the course of this investigation 53 manufactories of ice cream in Washington, large and small, were visited in order to determine the sanitary conditions prevailing where this food product was manufactured. In 62.2 per cent. of these places the ice cream was made in the basement or cellar. In nearly all cases this was improperly constructed to meet the demand of sanitary conditions. The ceilings were low and generally showed a gross collection of filth and cobwebs on the rough joists overhead. Occasionally a cellar was finished with a metal ceiling or plaster, but even when such improvements were noticed, the absence of proper natural light or ventilation generally makes the cellar basement in Washington an unfit place for the manufacture or preparation of ice cream. Many buildings are of old-time construction and were not originally designed for present-day purposes. With such construction as they showed it is practically impossible to keep the average basement or cellar in a proper and fit condition for the handling of milk, cream and milk products, no matter how honest and thorough may be the attempts of the tenants to do so.

While the premises themselves were of insanitary construction an immense benefit would accrue to the consumers of ice creams, charlotte russes, cream puffs, custards, etc., if a general house cleaning on the part of the tenants was demanded and enforced.

An analysis of the individual findings in the 53 places visited and the classification, so far as possible, on the basis of "clean, dirty, fair and filthy" showed the following results: 3 were clean, 19 dirty, 16 fair and 9 filthy.

While undoubtedly the insanitary conditions prevailing in and

about the ice-cream manufactories of Washington must influence the wholesomeness of the product from the bacteriological point of view, it is not entirely responsible for the great number of organisms which are ordinarily found in such foods. As previously stated, the cream and milk supply of the city has been investigated by the Bureau of Chemistry, and, although the detailed result will not be reported here, it is advisable to consider briefly the findings of the bacteriological examination of 130 samples of cream collected in the City of Washington from February 1 to July 27, 1907.

Samples showing less than 10,000 organisms per c.c., 0; from 10,000 to 50,000, 3; 50,000 to 100,000, 6; 100,000 to 250,000, 20; 250,000 to 500,000, 19; 500,000 to 1,000,000, 15.

Since ice cream is a food which is so largely used by children and invalids, whose digestive tracts are more readily open to bacterial infection than are those of the adult or the person in perfect health, the widespread presence of an organism to which so much responsibility for ill-doing is attached as appertains to the streptococcus should be looked upon with suspicion, and every care possible taken to exclude it from such food products, at least until it has been proven innocuous.

There seems to be a certain class of adults who have a predisposition against ice cream and who cannot ingest it without a feeling of discomfort, and in not a few cases symptoms of severe toxic poisoning result, manifesting the usual course of nausea, vomiting, diarrhea and pains in the abdomen, with cramps and muscular pains, often followed for a short time by general weakness, malaise, loss of appetite and headache. Where samples of ice cream associated with such disturbances have been examined bacteriologically they have often shown the presence of overwhelming numbers of streptococci, constituting practically a pure culture, or associated with organisms such as *B. coli* or other bacteria known to be found in insanitary conditions.

Where in the routine examination of a city's milk supply the absence or presence of streptococci is made the subject of investigation, it has been found that approximately 40 per cent. of the milk offered commercially contains these organisms, and in the cases of certain individual cities the results are much higher. According to the investigations, already quoted by Pennington & Walter, 80 per cent. of commercial ice cream contains these organisms.

Samples showing from 1,000,000 to 2,000,000 organisms per c.c., 13; 2,000,000 to 5,000,000, 11; 5,000,000 to 10,000,000, 10; 10,000,000 to 25,000,000, 14; 25,000,000 to 50,000,000, 10; 50,000,000 to 100,000,000, 7; 100,000,000 or above, 2.

The preceding summary indicates but too plainly the source of the majority of the organisms in ice cream. Not a single sample showed less than 10,000 organisms per c.c. and only 3 were less than 50,000, while 14, or 10.8 per cent. were between 10,000,000 and 25,000,000. The average number of organisms for all the samples examined was 12,130,080 per c.c. The maximum count was 309,000,000, and the minimum was 12,000 per c.c. An examination of these creams for the presence of fermenting organisms showed that when 2 per cent. dextrose fermentation tubes were inoculated with 0.01 c.c., 51.53 per cent. of the samples developed gas.

To determine the reason for this high frequency a study was conducted on the relative rate of growth of streptococci isolated from milk, in milk and in cream, and there appeared to be a much more rapid proliferation of the organism in cream than in milk. The difference in the relative rate of growth is more striking, also at the temperature of the refrigerator (about 12° C.) than at higher temperatures, which may account, at least to some extent, for the frequency with which this organism occurs in ice cream, and also for its overwhelming numbers.

It was noticed also that the thickening of cream, inoculated with pure culture of streptococci and kept cool, was very marked, its whipping quality greatly increased, and the separation of a curd was extremely slow, all of which qualities are sought after by the ice-cream maker.

In the discussion of ice cream in "Bacteriology and Public Health," by George Newman, he states that a "small outbreak occurred in the city of London, affecting sixteen telegraph boys. The symptoms were colic and diffuse abdominal pains, headache, vomiting, diarrhea and nervous depression. Dr. Collingridge's inquiry resulted in the following conclusions:

"(1) That in a number of cases of illness occurring among young persons of a susceptible age the symptoms were strictly identical and were characteristic of poisoning by ingestion of toxic material. (2) That the cases reported followed the ingestion of ice creams. (3) That ice creams subsequently obtained at

shops frequented by the patients contained bacilli of a virulent character. (4) That the symptoms observed were those generally following the ingestion of material containing such bacilli. (5) That where pathogenic bacilli were found, the ices had been manufactured under insanitary conditions. The majority of the manufacturers are aliens, and although the premises may be kept in a fairly sanitary condition, their personal habits unfortunately leave much to be desired where the preparation of food is concerned."

Dr. Kline examined 24 samples of ice cream from the same locality and found 13, or 54 per cent., to be poisonous to guinea pigs.

In July, 1904, the medical officer of health of Battersea (Report of 1904, Public Health Committee of the London County Council) reported an outbreak of illness among the persons who had eaten ice cream purchased at a particular shop. As usual in such toxemias, the symptoms included abdominal pain, diarrhea and collapse. The ice cream causing these poisonings had all been eaten and therefore could not be examined, but an inspection of the premises showed very filthy conditions, and in all probability the contamination of the cream was due to a dust bin in the immediate proximity of the shelf on which the ice-cream vessels were stored.

## THE SIGNIFICANCE OF A PURE ICE CREAM SUPPLY IN RELATION TO PUBLIC HEALTH.

A study of the literature dealing with diseases traced to the eating of ice cream shows that not only are isolated cases more or less severe, even sometimes resulting in death, fairly numerous, but widespread epidemics have been caused by the toxicity of the substance. Such diseases are, of course, of gastro-intestinal origin. Among these epidemics is one of typhoid fever described by Dr. George Turner, occurring at Deptford in 1891, which was apparently caused by ice cream. Another epidemic of this disease occurred in Liverpool in 1897 during which 27 cases were traced to eating ice cream.

In 1902, in the city of London, 18 cases of typhoid fever were traced by the health officer of Finsbury (see report of health of Finsbury, 1902, page 67) to ice cream as the source of infection.

More commonly, however, the illness caused by ice cream has the symptoms of colic, headache, diarrhea and depression rather than a specific typhoid infection. "Such an outbreak occurred in Birmingham during the summer of 1905 (Thresh & Porter, Preservatives in Foods and Food Examination, page 280) and was investigated by Dr. Robertson, the city medical officer of health. Out of 250 consumers served 52 cases of illness occurred, 4 only of the patients being over 14 years of age. The interval which elapsed between the eating of the ice cream and the onset of the illness varied from half an hour to eight and a half hours. All the persons suffered from diarrhea and collapse. No irritant poison was discoverable by chemical analysis. Professor Leith examined the ice cream bacteriologically and found therein a bacillus of the colon group capable of causing the death of guinea pigs. From an examination of the premises in which the ice cream was manufactured it appeared probable that it had become contaminated while standing in the cooling shed after boiling and before freezing. Opposite this shed were three waterclosets in an extremely filthy condition, and possibly organisms of excremental origin had fallen upon one of the buckets of the cream while it was in a warm condition. These would rapidly multiply and may have produced toxins or ptomaines. Neither the bacilli nor their poisonous products would be affected by the subsequent freezing."

General Conclusions.—From a careful study of the data which have been collected it is evident that the following conclusions may be drawn :

First. The sanitary conditions of many of the localities where ice cream is manufactured in the District of Columbia are not at all satisfactory. Radical improvements in such localities are necessary to secure purity and freedom from contamination. It is a recognized fact that many cases of violent poisoning which arise from eating cream or ice cream are due to insanitary conditions surrounding the dairy or ice-cream factory, the storage of these products for an improper length of time, and the contamination which they suffer by reason of insanitary conditions by infection from preexisting poisonous bodies. The development of ptomaine poisoning in cream and ice cream is entirely prevented by using a fresh sanitary raw product, manufacturing it in perfectly clean surroundings, and disposing of it within a reasonable length of time after manufacture.

Second. The average percentage of fat in the cream sold commercially in the District of Columbia is slightly less than that required by the statute governing the sale of cream in the District of Columbia. It is, however, well within the standard established for cream in general by the Secretary of Agriculture. As long as the Act of Congress relating to the standard of cream in the District of Columbia is on the statute books the dealers should comply with its provisions, and cream containing less than 20 per cent. of butter fat should not be sold in the District.

Third. The bacteriological examination of cream and ice cream in the District of Columbia shows that much of it contains a number of bacteria which is far in excess of that which should be found in pure, uncontaminated fresh materials. This enormous bacterial flora is due to two causes, namely, insanitary conditions of the dairy and factory, and long keeping of the product. From this point of view, therefore, a very large percentage of both cream and ice cream sold in the District of Columbia is highly objectionable.

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## The Water Supply of Dairy Farms.

By B. MEADE BOLTON, M. D.,

One time Expert, U. S. Department of Agriculture.

The investigation which I have to report consists of the sanitary inspection and a chemical and a bacteriological examination of the water supplies of 140 dairies around Frederick and Walkersville, in Maryland, and 150 dairies along the Bluemont division of the Southern Railway in Virginia, and around Woodstock in the Valley.

*Methods of Procedure.*—The sanitary inspection consisted in noting the proximity to sources of domestic and barnyard pollution, the slope of the land, the character of the soil, the presence or the absence of an underlying stratum of rock; in the case of wells, the depth, the construction of the coping and cover, the effect of local rains on the turbidity; in the case of springs, the presence or absence of a tight coping, and the liability to pollution from surface drainage. In short, all the conditions which would seem likely to affect the purity of the water were noted. Moreover, the sanitary inspection took into account the matter of

abundance and the convenience of the water supply in all cases. The results of the sanitary inspection were recorded on special blank forms, which were also subsequently filled in with the results of the bacteriological examination.

In each case a bottle was filled with the water for chemical analysis, and Petri dish plates were poured, and shake cultures in neutral-red agar were made. All these were shipped to Washington as promplty as possible, usually on the same day on which the samples were collected. The chemical examinations were made by chemists in the Bureau of Animal Industry under the supervision of Dr. T. Malcolm Price, the cultures were taken in charge by Dr. F. W. Tilley during much of the time, and worked through by him.

Photographs of the water supplies, showing the location and surroundings, were made of nearly all the dairies in Maryland and of those on the Bluemont branch of the Southern Railway. Most of these photographs were taken by Dr. E. M. Santee, formerly of the Dairy Division; some of the others were made by Mr. Clarence B. Lane, Asst. Chief of the same Division.

*Standards Assumed.*—In interpreting the results of the chemical analyses it was necessary to assume some standard. This was done in conformity with the statements in the text-books. Regard was also had for the results obtained in the present investigation, taking the results obtained from the analyses of water above suspicion as a basis. The standard adopted in this manner was: For nitrites, 0.01 parts per million; for nitrates, 15 parts; for free ammonia, 0.02 parts; for albuminoid ammonia, 0.05. The amount of chlorine in uncontaminated wells in Maryland varied from 5 to 47 parts per million, the springs in Maryland, from 4 to 6 parts per million. In Virginia there is a belt extending roughly from Herndon to Leesburg in which the amount of chlorine in otherwise pure water runs as high as 73 parts per million. The minimum found in this district was 11 parts per million. Outside of this district the chlorine ran from 5 to 63 parts per million. In the Virginia springs the chlorine ran from 2 to 20 parts per million.

In conformity with the standards adopted the water supplies were rated as "good," "bad" or "suspicious," from the sanitary inspection, and they were rated in the same manner from the chemical analysis, although it was impossible to adhere absolutely to this, or indeed to any standard in all cases.

Below are given some of the salient points brought out by the investigation; a fuller account is given in a publication soon to appear from the Public Health and Marine Hospital Service.* A complete report of the results, with photographs of the water supplies examined, was made to the Secretary of Agriculture, and an abstract from this report will appear in the forthcoming Year-book of the Department of Agriculture.

*Results, Maryland Dairy Water Supplies.*—There were 92 wells, 42 springs and 14 cisterns in all examined in Maryland.

*Sanitary Inspection.*—Sixty (65 per cent.) of the wells; 17 (40 per cent.) of the springs, and 9 (64 per cent.) of the cisterns were rated as good on sanitary inspection alone. Some of these showed evidence of chemical pollution or of the presence of the colon or paracolon bacillus, or of both chemical and bacteriological pollution. Of the wells, 22 (24 per cent.); of the springs, 10 (24 per cent.); of the cisterns, none which were rated as good on sanitary inspection failed to show either bacteriological or chemical evidence of pollution. In other words, 24 per cent. of the wells and the same per cent. of the springs appeared to fulfill all sanitary requirements. This statement requires some qualification in so far as the springs are concerned, since, strictly speaking, none of the springs were properly protected from the danger of contamination by the introduction of surface drainage or of contamination from substances introduced into the basin by carelessness or by intention.

Fourteen (15 per cent.) of the wells; 16 (40 per cent.) of the springs; 2 (14 per cent.) of the cisterns, were rated as bad from a sanitary inspection alone. Three of the wells and three of the springs rated as bad showed no chemical nor bacteriological evidence of pollution.

Eighteen (20 per cent.) of the wells; 9 (21 per cent.) of the springs; and 1 cistern were rated as suspicious, and in all but one of the wells and in all but three of the springs so rated there were chemical or bacteriological, or both, evidences of pollution.

*Chemical Analysis.*—Twenty (22 per cent.) of the wells; 6 (14 per cent.) of the springs; 7 (50 per cent.) of the cisterns, showed one or more of the substances taken as indicative of pollution in greater amounts than allowed by the standard given above.

* Bull. No. 41, Hyg. Lab., U. S. Pub. Health and Marine Hospital Service, Washington, D. C., pp. 527–539 and 541–556.

Thirty-one (35 per cent.) of the wells; 15 (35 per cent.) of the springs; 3 (22 per cent.) of the cisterns, showed very slightly higher amounts of the substances taken indicative of pollution than those prescribed, and these were rated as suspicious. Thirty-nine (42 per cent.) of the wells; 22 (52 per cent.) of the springs; 2 (15 per cent.) of the cisterns, showed no evidence of chemical pollution. The substances taken to indicate pollution were all within prescribed limits.

*Bacteriological Examination.*—In the wells rated as good on sanitary inspection and which showed no chemical nor bacteriological evidence of pollution the number of bacteria ran from 10 to 500 per c.c.; in the springs of like character the number of bacteria ran from 15 to 320 per c.c. B. coli or B. paracoli was present in the water from 43 (45 per cent.) of the wells; 16 (40 per cent.) of the springs; 8 (60 per cent.) of the cisterns.

*Virginia Dairy Water Supplies.*—There were 75 wells, 64 springs, 17 cisterns in all examined in Virginia. Of these 53 of the wells and springs were examined a second time after the lapse of a few months.

*Sanitary Inspection.*—Forty (53 per cent.) of the wells; 36 (48 per cent.) of the springs; 10 (59 per cent.) of the cisterns, were rated as "good" on sanitary inspection alone; but, as in the case of the Maryland water supplies, some of these so rated showed chemical or bacteriological evidence of pollution, or both, at one or the other examination, or at both examinations.

Ten (13 per cent.) of the wells; 9 (14 per cent.) of the springs; 1 of the cisterns, were rated as satisfying all sanitary conditions in regard to sanitary inspection, and chemical and bacteriological examination. The same qualification applies to the springs in Virginia as in Maryland, though there were a few springs in Virginia which were inclosed in a tight coping and were thus protected from the introduction of contamination into the basin.

Eleven (15 per cent.) of the wells; 21 (33 per cent.) of the springs were rated as "bad." Sixteen (21 per cent.) of the wells; 6 (9 per cent.) of the springs; 7 (41 per cent.) of the cisterns were rated "suspicious."

*Chemical Analysis at one or both Examinations.*—Eleven (17 per cent.) of the wells; 5 (8 per cent.) of the springs; 8 (50 per cent.) of the cisterns, showed evidence of pollution according to the assumed standards. Twenty-four (33 per cent.) of the wells;

16 (25 per cent.) of the springs; 10 (59 per cent.) of the cisterns, were rated "suspicious." Twenty-nine (40 per cent.) of the wells; 36 (60 per cent.) of the springs; 3 (18 per cent.) of the cisterns, showed substances indicative of pollution, but not in excess of the prescribed limits.

*Bacteriological Examination.*—The number of bacteria in the water from wells which were above suspicion, and which showed no evidence of contamination, either bacteriological or chemical, ran from 0 to 510; in the springs of like character it ran from 0 to 120. B. coli or B. paracoli were present at one or the other examination in the water from 57 (75 per cent.) of the wells; 41 (64 per cent.) of the springs; 15 (88 per cent.) of the cisterns.

*Conclusions.*—The results recorded above seem to show that there is room for improvement in the water supplies of the dairy farms, and certain recommendations in regard to the betterment may not be out of place. In justice to the farmers it should be stated that the experience gained in this respect in the present investigation shows that the dairymen, as a rule, are willing and anxious to act upon all reasonable suggestions in regard to correcting insanitary conditions of their water supplies which exist either through oversight or ignorance on their part. It can be said with perfect sincerity that with but few exceptions they were more than willing to cooperate in the effort to insure their water supplies from contamination, many of them taking the very reasonable ground that they desired this not only in order to comply with the regulations of the Health Department, but on their own account as well. They frequently remarked that if there was anything the matter with the water they wished to know it. In some cases they wanted all the water on their places examined—not only that used in the dairy, but also that used by the household and by the cattle in cases where these supplies were all different.

The three requisites of a sanitary water supply are *purity*, *abundance*, *convenience*.

*Purity.*—The purity of the water supply is that factor in a sanitary supply which is the most obvious in importance; in many cases it is the only one to which importance is attached. Since water is the great solvent, it takes up more or less of everything with which it comes in contact in its circuit from the clouds through the air and soil and finally through the rivers to the

ocean and back to the clouds. Not all the substances taken up by the water in its travels are injurious to health, and some of the substances are beneficial. In fact, it is probably correct to say that only the bacteria which gain entrance are directly important in relation to the potability of water. No other substances are present in sufficient amount, except under very peculiar circumstances, to cause any injurious effect on health. Factory waste sometimes poisons streams and springs and wells, it is true, but these are exceptional cases.

The great desideratum is to protect the water from contamination with bacteria. But in dairy-water supplies, aside from the specific pathogenic bacteria, the presence of other kinds should be guarded against, since certain kinds of bacteria which are not themselves the cause of disease, cause changes in the milk which may make the milk unfit for food, especially for infants. It would seem especially important, for this reason, that the water used for washing the cans, the hands of the milker, the cows' udders and any other objects with which the milk comes in contact should be as free as possible from all sorts of bacteria, whether they are in themselves pathogenic or such as may cause deleterious changes in the milk. As yet it is not possible to decide in a given case with certainty that a sample of water contains pathogenic bacteria, or, if this is possible at all, the time necessary to make the determination is so long that it is of little or no practical benefit. The best that can be done is to determine by chemical and bacteriological means certain evidences of pollution. This is, after all, perhaps, as useful from a practical point of view as the detection of the specific bacteria would be; for if all possible means are used to prevent the entrance of all kinds of bacteria, and if the laboratory examination of the water demonstrates that the means adopted are successful, it follows that the injurious bacteria are also excluded.

It follows that every precaution should be taken to preserve the water from contamination with bacteria. In order to do this the source should be as remote as possible from the danger of domestic and barnyard contamination; not necessarily remote in distance, but by configuration of the land and by artificial devices for protection. The drainage should be from the well toward the house and barn, or if this is not possible, there should be a natural or an artificial barrier between the water supply and

these sources of pollution. An underlying stratum of rock and an impervious shaft and coping in the case of wells are good protection. The disposal of domestic sewage should be such as to insure that none of it can gain entrance to the water either by seepage through the soil or by drainage from the surface. The shaft of the well should be tight. Terra cotta pipe would seem to be better than brick and mortar for the shaft. Wells bored through rock are apparently better protected than those through earth.

It would necessitate making the present paper much too long to go exhaustively into the details of the proper construction of wells, and what has been said will serve to show what the object aimed at should be. In the case of springs it might be said that apparently few farmers seem to realize the dangers of contamination. No spring can be said to fulfill the requirements of a sanitary supply unless it is guarded by an impervious coping on all sides and has a cover. Many springs were met with in the course of the present investigation which were carefully protected by an impervious coping on three sides, but were exposed on one side to contamination from filth from the shoes of all who came to draw water. In many cases steps lead down to the edge of the water, and anyone coming from the barn to dip water would necessarily leave filth on the steps to be washed into the spring by careless dipping or by rain. A terra cotta drain tile sunk into the spring and cemented around with an opening and spout in the side of the tile would afford perfect protection if in addition there were a tight cover provided. Where it is necessary for any reason to resort to cisterns these should be watertight, and constructed with two compartments, separated by a brick or sandstone partition, one to catch the water as it runs in, the other to hold the water for use. The cistern should be often cleaned out and purified with lime. The roof from which the water is caught should be preferably of slate. Cistern water is apt to be tainted from wooden shingles.

These are merely a few suggestions made more or less at random. Each water supply presents its own special problem only to be solved by careful study of the conditions in each case.

*Abundance.*—The importance of the abundance of the water is little, if any, less than the importance of the purity. Insufficient supply inevitably leads to improper cleansing and to use of the

same water for washing several vessels. It necessitates a false economy. Some hygienists, for this reason, condemn the use of meters in cities, since many persons, particularly the poor, will stint themselves in the matter of water for purposes of cleanliness if the water is paid for by the amount used. In the present case, there appeared to be no lack of water on any of the places visited.

*Convenience.*—No one of the factors going to make a sanitary water supply is so much neglected on the farm as the matter of convenience; and yet there is nothing which is more conducive to cleanliness than convenience in this direction. Indeed, in the comparatively few places, on the whole, which were fitted up with tanks, there was a noticeable superiority in the cleanliness of the persons themselves and of the houses and the utensils used in the dairy. It is true that on the places so fitted out the people are for the most part superior in intelligence to those living on farms where the water has to be brought from the well or from the spring in pails. The amount of time and labor expended in carrying water about on a place which is improperly equipped in this respect must, in the aggregate, be very large, much more than enough to pay for the installation of some mechanical arrangement in a short time. A windmill and tank or an engine and tank are not expensive, and pay for themselves many times over in a short while, besides encouraging the unlimited use of water for cleanliness. In the case of springs, it would seem better to use a windmill or engine, rather than a ram, since it is difficult to guard the water forced by ram from the danger of contamination.

The results of the bacteriological examination of some sixty dairy-water supplies by Mr. Kellerman are doubtless familiar to you; they seem in the main to agree with the results obtained in the present investigation, which was taken up where Mr. Kellerman left off. The statement is probably not an exaggeration of the fact that the most important factor in the production of clean milk is the abundant use of clean water in the washing of the hands of the milker, the udders of the cows and the vessels employed in the dairy. A few drops of foul water at any stage in the preparation of the milk will serve to contaminate the whole quantity, owing to the rapid multiplication of bacteria in milk, since milk furnishes an excellent medium for the growth of many kinds of bacteria.

## Early Diagnosis of Typhoid Fever.

By L. L. LUMSDEN,

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I am glad to have this opportunity to speak to you on the subject of the diagnosis of typhoid fever.

As a continuous knowledge of the whereabouts of the enemy is of vast importance to an army, so is the correct diagnosis of typhoid fever cases of vast importance to those who have to do with the prevention of typhoid infection.

We hear much of typhoid fever outbreaks being traced to water, milk, raw vegetables, shell-fish, soil pollution, etc. Even at this late date we from time to time meet some one who, after having made some study of the disease, has arrived at the conclusion that typhoid fever infection generally is almost, if not entirely, water-borne, another who perhaps holds that milk is the only factor deserving serious consideration, and others who claim that personal contact or some other one factor is entirely responsible.

In certain outbreaks of typhoid fever it has been established quite definitely that some one factor predominated in the spread of the infection, but in most instances, particularly in those communities in which the disease prevails endemically, a number of factors are in operation.

There is no scientific evidence that typhoid fever infection arises *de novo* in water, milk, soil, or in any of the other media by which the infection is conveyed. All known facts on the subject support the view, now quite generally held, that these substances serve only as agents for transmitting the infection from one person to another. In other words, the human being is the natural permanent host of the parasitic organisms which cause typhoid fever, and if these organisms did not, from time to time, gain access to the bodies of persons they would soon cease to exist. Therefore the destruction of the infection as it is discharged from the bodies of persons is the immediate and best way of preventing the spread of the disease, and in an attempt to carry out this system of prophylaxis the correct diagnosis of cases is, of course, of fundamental importance.

The results of recent investigations indicate that infection is

discharged from the body of a typhoid-fever patient from the very beginning of the disease. H. Conradi*, who has made extensive studies of typhoid fever in Germany, states that he has reached the conviction that not only is infection transmitted most often during the earliest days of the disease, but that it also frequently takes place during the incubation period. Therefore it is important that cases of typhoid fever be recognized early in the attack.

Unfortunately the diagnosis of typhoid fever, based on symptomatology, during the first few days of the attack is very difficult. For many cases one cannot be positive of the diagnosis until the eighth or tenth day, and there are a good many cases following an irregular clinical course which go through the attack without being recognized. Murchison well says, "There is no disease, in fact, which exhibits a more protean character, from the predominance of certain symptoms and from the presence of complications."

The symptoms at onset of the attack and during the first week of the disease have a wide range of variability. McCrae, in Osler's "Modern Medicine," reviews the most frequent symptoms at the onset of 1,500 cases in the Johns Hopkins Hospital series, as follows: Headache, 1,117; anorexia, 825; diarrhea, 516; abdominal pain, 443; general malaise, 436; vomiting, 404; cough, 393; chilly sensations, 392; chill, 334; epistaxis, 323; fever, 285; nausea, 255; constipation, 249; backache, 215; sweating, 207; general pains, 196; weakness, 112; delirium, 65; dizziness, 61; stiffness of the neck, 47; sore throat, 32; herpes, 18; deafness, 13; insomnia, 11; photophobia, 6; intestinal hemorrhage, 4; convulsions, 3; jaundice, 2; retention of urine, 1; otitis media, 1; hiccough, 1; and bone lesions, 1.

With such a variable symptomatology in the early stages it is easy to understand why typhoid fever so frequently is mistaken for other diseases, or *vice versa*, and why so often one must hesitate about making a diagnosis on clinical evidence alone.

Among the diseases liable to be confounded with typhoid fever are tuberculosis, malarial fevers, septicemia, endocarditis, influenza, febricula, intoxications (such as ptomaine poisoning), acute exanthemata, trichinosis, syphilis, pneumonia, acute nephritis, appendicitis, etc. For some of these a few days' observation will

* *Deutsche Medicinische Wochenschrift*, Vol. 33, No. 41, Oct. 10, 1907.

make the diagnosis clear, but for the others the diagnosis, in many instances, will remain doubtful. McCrae, in speaking of the clinical features of typhoid fever, states, "There is no symptom or sign which is invariably present, and although fever may be said to be of almost constant occurrence, yet this may be of slight degree or more or less irregular."

As much damage may be done before a positive diagnosis can be made it is highly advisable to begin prophylactic measures upon the first suspicion that the case may be one of typhoid fever and to continue these measures until typhoid fever as a possibility is excluded. The disinfection of the excreta will do the patient no harm, while it may save the community an epidemic.

The diagnosis in many instances can be made in the laboratory some time before it can be made at the bedside, and there are some cases for which the laboratory methods will give the diagnosis when the clinical features have only suggested a slight possibility of typhoid fever. Of the laboratory methods which assist us is the agglutination phenomenon, referred to as the Gruber-Widal reaction, or more commonly as the Widal reaction. Unfortunately for purposes of early diagnosis this reaction is very rarely given by the blood serum of the patient before the seventh or eighth day of the disease. However, the reaction is of great value for the ultimate diagnosis, and so aids greatly in epidemiological studies. When the result of the test is negative it is neither for nor against a diagnosis of typhoid fever, because a positive reaction may not be obtained until late in the disease or in a relapse, or even some time after convalescence is well established. Furthermore, unless tests are made daily, a positive result may be missed, as in some exceptional cases the agglutinative property of the blood persists for only two or three days. A careful technique in making the test is all-important. A good standard is a serum dilution of 1–50, and time 1 hour. In a large series of cases the Gruber-Widal reaction should be positive in over 95 per cent. McCrae states, "It seems fair to consider that the Widal reaction is of great value when a positive result is given, and that, with proper technique, this justifies the diagnosis of typhoid fever, a previous attack being excluded."

Another laboratory method of great assistance in the diagnosis of suspected cases of typhoid fever is the bacteriological examination of the blood for the typhoid bacillus. This method has the marked advantage of giving positive results in the earliest

stages of the disease. In fact, the earlier in the disease the blood is examined, the better are the chances of recovering the typhoid bacillus. Heinrich Kayser*, working in Germany, obtained positive results in 96 per cent. of cases examined in the first week, in 65 per cent. examined in the second week, in 42 per cent. in the third week, and in 35 per cent. in the fourth week. Kayser used only 2.5 c.c. of blood at each examination.

Coleman and Buxton†, working at Bellevue Hospital in New York, obtained positive results in all of the twenty-four cases which were clinically typhoid fever. Their examinations were made from the fifth to the twenty-first day of the disease. They conclude that the typhoid bacillus is present in the blood of every case of typhoid fever throughout its course, and that failure to recover the bacillus is due to error in technique—diminished number of organisms in the blood during the late stages of the disease making their isolation difficult. It is now quite generally held by those who have made extensive investigations of the subject, that with recent improved technique, the examination of the blood of typhoid fever patients in the first week of the disease should demonstrate the typhoid bacillus in approximately 100 per cent. of cases. So in this method we have a means of diagnosing typhoid fever of almost, if not quite, as much value as is the bacteriological examination in cases of suspected diphtheria. The blood for examination is best taken with a syringe by puncture of one of the veins at the elbow. The operation causes no more pain than the administration of a hypodermic injection, and when properly done is entirely free of danger. Results of the examination can be reported in about 24 hours after the blood is received at the laboratory.

Some ultra-conservative practitioners of medicine may hold the view that in private practice one is not justified in subjecting patients to the annoyance of having blood taken for bacteriological examination or for frequent Widal tests in order to clear up a doubtful diagnosis. The annoyance to the patient is trivial, the value of a correct diagnosis to the community is great.

Error in diagnosis seriously handicaps those making epidemiological studies of typhoid fever in a community. All data obtained in regard to cases reported as typhoid fever under mistaken diagnoses are misleading, and that much obscure the general

* *Muench. Med. Woch*, 1906, p. 823.
† *Am. Jour. Med. Science*, June, 1907.

problem. Infection spread directly by contact, or indirectly by persons, flies, milk, etc., from cases unrecognized and unreported, cannot be traced. From the standpoint of prophylaxis, the unrecognized cases are, of course, more important than the cases erroneously reported as typhoid fever.

In the course of our investigations in 1906 and 1907, of the prevalence of typhoid fever in the District of Columbia, we frequently obtained histories of cases which had had irregular fever for only four or five days, no characteristic symptoms of typhoid fever, and the patient out of bed and apparently well within a week or ten days from onset of illness. Some of these cases probably were typhoid fever, the majority of them probably were not. Such cases should not be reported unless the diagnosis is confirmed bacteriologically.

In conclusion I wish to urge the physicians of the District of Columbia to keep in mind continually the importance of correct diagnosis of typhoid fever cases and in doubtful cases to carry out prophylactic measures until the diagnosis of typhoid fever can be positively excluded.

In the previous addresses this evening we have heard good reports of the water supply of the District of Columbia, particularly for the summer of 1907. Let us hope that the water may continue good and forever cease to be a factor in the spread of typhoid fever in the District of Columbia. Let us hope that the efforts to obtain a pure or purified milk supply may be crowned with success.

With water and milk eliminated, the principal remaining known factor in the spread of typhoid fever infection is personal contact. On the elimination of this contact factor the efforts of practicing physicians and health officials should be concentrated.

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## Urotropin as a Prophylactic wherewith to Combat the Spread of Typhoid Fever by Chronic Bacillus Carriers.

By J. H. KASTLE,
U. S. Public Health and Marine Hospital Service.

In the time which you have placed at my disposal I desire to call your attention to some recent investigations by S. J. Crowe,* working under the direction of Dr. A. S. Loevenhart, of the De-

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partment of Pharmacology of the Johns Hopkins University, on the use of urotropin as a prophylactic wherewith to combat the spread of typhoid fever by chronic bacillus carriers.

Within the past ten years it has been pointed out that not infrequently persons who have entirely recovered from an attack of typhoid fever may continue to discharge the typhoid bacillus through the urine and feces for months and even years; and, stranger still, that persons who have never had typhoid fever at all, at least in recognizable form, may harbor the typhoid organism in their gall-bladders and intestinal tracts for long periods of time.

Only last year some of us here heard Dr. Soper tell the graphic story of an Irish cook at Oyster Bay, who, in the course of a somewhat checkered career, had been responsible for a number of small epidemics of typhoid fever in Oyster Bay and other localities. As a matter of fact the chronic bacillus carrier has come to occupy a conspicuous place in recent medical literature, and I have no doubt that such persons, unknown to themselves, of course, are responsible to some extent for the origin of typhoid fever in all communities, large or small, and the importance of the proper supervision and control of the chronic bacillus carrier, as a prophylactic measure against the spread of typhoid fever, has come to be recognized as one of the most necessary steps looking to the eradication of this disease. Obviously, however, it is a subject which presents many practical difficulties, as might be gathered from Dr. Soper's vivid description of the forcible detention of the Irish woman from Oyster Bay, in which case, if I remember rightly, it required the gentle offices of an interne, a policeman and ambulance driver to convey her safely to the detention hospital.

The treatment of such conditions as those met with in the bacillus carrier obviously resolves itself into two measures—either the disinfection of the urine and feces of such persons as are chronic bacillus carriers, and the restriction of their occupations and intercourse with their fellow men, or the elimination of the infection itself by surgical or therapeutic treatment. Obviously, the latter is the end to be attained, provided it can be done without injury to the patient.

The treatment of bacilluria by the use of antiseptics has already been attended with some success. Of the various substances

thus far studied hexamethylene amine, $C_6H_{12}N_4$ (an antiseptic employed in medicine under the name of urotropin), has been found to give the best results in the treatment of bacilluria. According to Richardson, this drug will remove the organisms, even in cystitis, in the vast majority of cases. In eight out of nine cases investigated he observed the disappearance of the bacilli after the administration of 60 grains or less of the remedy when given in 10-grain doses three times a day—one case, however, requiring 200 grains. Mild gastric disturbances and hematuria were the only complications met with. These were promptly removed by discontinuing the remedy or diminishing the dose. Richardson's observations on the treatment of bacilluria by urotropin have been confirmed by other medical authorities, although Schumburg is inclined to believe that the action of the drug on the typhoid bacillus is only inhibitory. Quite recently, Mr. S. J. Crowe, working under the direction of Dr. A. S. Loevenhart, in the pharmacological laboratory of the Johns Hopkins University, has obtained some very interesting results in the treatment of infections of the gallbladder by urotropin. It is to these that I desire particularly to call your attention. Crowe has succeeded in showing, first, that after administration by the mouth, hexamethylene amine, or its decomposition product, formaldehyde, appears in the bile, cerebro-spinal fluid, saliva, the pleural effusion and the blood of man; and in the case of a rabbit which had received 0.5 of a gram of the drug by mouth, formaldehyde was detected in the blood 24 hours after administration.

Second, that it finds its way into the gallbladder through the liver, and also through the wall of the gallbladder itself.

Third, that when given in sufficiently large doses, 75 grains per day, it appears in the bile in quantities sufficient to exercise a decided bactericidal action.

He concludes further, from pharmacological studies made in the Baltimore Hospitals, that in addition to its value as a genito-urinary antiseptic, hexamethylene amine will probably prove efficient:

(1) In acute infections of the gallbladder and as a prophylactic before gallbladder operations.

(2) In convalescence from typhoid fever—in which case the advantages attending its use will be twofold: 1st, as a prophylactic against the formation of gallstones; 2d, as a means of effect-

ing sterilization of the gallbladder, thereby preventing the patient from becoming a chronic bacillus carrier.

In support of these conclusions this author cites, among others, the following cases treated at the Johns Hopkins Hospital.

CASE I.—In Dr. Kelly's service, Johns Hopkins Hospital.—Mrs. B., aged 45, was admitted for some pelvic trouble. During the routine exploration at the time of the operation, the gallbladder was discovered to be distended with gallstones. A second incision was made and 45 small stones, together with a large amount of sandy, mucoid material, were removed, and a biliary fistula made. No cultures were obtained from the gallbladder at the time of operation, but ten days later, before the administration of hexamethylene amine, plates inoculated with the material aspirated from the sinus gave the following results:

| When inoculated with— | After 24 hours. | Organisms found. |
|---|---|---|
| 1 loop bile. | 1,200 colonies. | B. typhosus, B. pyocyaneus and other organisms not determined. |
| 3 loop bile. | 4,000 colonies. | |
| 5 loop bile. | 8,000 colonies. | |

Immediately after making these cultures the patient received her first dose of hexamethylene amine, and within the next 24 hours there was administered to her five doses of fifteen grains each, or a total of 75 grains. Four hours after the last dose a second portion of the material was aspirated from the sinus and plates were inoculated as before, with the following results:

| When inoculated with— | After 24 hours. | Remarks. |
|---|---|---|
| 1 loop bile. | No growth. | Plates remained sterile after four days incubation. |
| 3 loop bile. | No growth. | |
| 5 loop bile. | No growth. | |

Some of the material obtained from the sinus was diluted with water, acidified and distilled. The distillate gave a positive test for formaldehyde, showing that either hexamethylene amine or its decomposition product, formaldehyde, was present in the bile in considerable quantity.

Especial interest attaches to this case, first, because of the finding of gallstones;

Secondly, because of the isolation of the typhoid bacillus in the absence of any history of typhoid fever;

Thirdly, on account of the rapid disappearance of the typhoid

bacillus, together with the other organisms present, after the administration of 75 grains of hexamethylene amine by mouth.

CASE II.—In Dr. Halstead's service, at the Johns Hopkins Hospital.—The patient, 48 years of age, was admitted for severe attacks of abdominal pain, associated with jaundice. A single gallstone was found in the gallbladder and a biliary fistula was made. No cultures were obtained from the gallbladder at the operation, but a few hours later plates were inoculated with some of the material discharging through the tube. Several varieties of organisms were found to be present, among them B. typhosus and B. coli communis, which were isolated and identified. The bile discharging through the tube was of a dirty brown color and contained a considerable amount of mucus.

The effect of gradually increasing doses of hexamethylene amine was determined by inoculating plates with the bile discharging through the drainage tube and noting the variation in the actual number of colonies from day to day. The results of these observations are tabulated below.

| Date. | Dose per 24 hours. | No. of plate. | Amount of bile used. | No. of colonies. | Remarks. Organisms found. |
|---|---|---|---|---|---|
| Dec. 4. | None | I | 1 loop | 150,000 | B. coli, B. typhosus and others not determined. |
| 5. | 10 grains | II | 1 loop | 150,000 | Discharging bile of dirty brown color. Foul odor. |
| 6. | 20 grains | III | 1 loop | 100,000 | |
| 7. | 35 grains | IV | 1 loop | 75,000 | Bile still of dirty brown color. |
| 8. | 45 grains | V | 1 loop | 60,000 | Color of bile is improved. |
| 9. | 60 grains | VI | 1 loop | 20,000 | |
| 10. | 60 grains | VII | 1 loop | 12,000 | Drain removed; wound healthy and clean. |
| 11. | 75 grains | VIII | 1 loop | 300 | Bile has become perfectly clear in the past 24 hours. |
| 12. | 75 grains | IX | 1 c.c. | 8 | B. coli alone present; wound healing rapidly. |
| 13. | 75 grains | X | 1 c.c. | Sterile | |
| 14. | 75 grains | XI | 1 c.c. | Sterile | |
| 15. | 75 grains | XII | 1 c.c. | Sterile | Wound practically healed. |

The fistula rapidly closed and the patient left the hospital a few days later.

In this case, also, specimens of the bile were distilled and tested chemically after each increase in the dose. Rough estimations made by comparing the color given by the distillate on different days seemed to indicate that the quantity of hexamethylene amine or formaldehyde excreted in the bile varies with the dose.

The relationship between the amount of hexamethylene amine given in 24 hours and the rapidity with which the organisms disappear is quite strikingly shown in these cases. In the first case the organisms very rapidly disappeared after 75 grains, while in the second case there was a less marked effect on the number of organisms present after 35, 45 and 60 grains. These findings would seem to indicate that 75 grains a day must be given in order to quickly obtain the desired effect in the gallbladder. Smaller doses, however, continued over a long period of time may prove equally efficient.

Case III.—In Dr. Halstead's service, at the Johns Hopkins Hospital.—The patient, 32 years of age, was admitted with sharp, intermittent, crampy pains throughout the entire abdomen, associated with nausea and vomiting. It was thought to be an acute attack of appendicitis, but on opening the abdomen, the fundus of a much distended gallbladder presented in the wound. After aspirating several ounces of pus, the gallbladder was opened and drained. At the time of the operation, a pure culture of B. typhosus was obtained from the gallbladder. The patient, however, was quite sure she had never had typhoid fever.

This case was not brought to Crowe's attention until ten days after the operation, during which time she had been receiving a prophylactic dose of 15 grains of hexamethylene amine a day because of the necessity of frequent catheterization. At the end of this time cultures from the sinus proved to be absolutely sterile. The dose was then increased to 30 grains a day. The material aspirated from the sinus showed the presence of hexamethylene amine and a subsequent culture failed to reveal the typhoid bacillus. The patient was discharged on the 26th day after operation in excellent condition.

Several cases of hematuria following the administration of hexamethylene amine have been reported. In the series of cases investigated by Crowe, however, no such symptom was noted.

In no case were any gastro-intestinal disturbances observed, and even after 80 grains per day for 15 days, the appetite remained good and the bowels regular. After receiving 80 grains per day for 24 days, one patient developed painful and frequent micturition, which completely disappeared, however, on withholding the drug. No albumin or red blood corpuscles were found in the urine and only a slight increase in the number of epithelial cells was noted.

To my mind, these results, while not numerous, are, nevertheless, very convincing, and it would seem that in hexamethylene amine medical practitioners have at their disposal a comparatively harmless antiseptic wherewith to effect the cure of these chronic typhoid infections and thereby eliminate the bacillus carrier as a cause of the contagion.

In conclusion, I desire to express my thanks to Mr. Crowe and Dr. Loevenhart for their kindness in permitting me to make use of their manuscript and for furnishing me with the records of their cases.

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## Results of Dairy Inspection.

By C. B. LANE,

Assistant Chief, Dairy Division, U. S. Department of Agriculture.

There is perhaps no more interesting problem, nor one more important in the dairy world, than the supply of pure milk, and there is scarcely a food product of any importance that has been more neglected than milk. Considering its universal use, its great food value and the dangers connected with its production, it should be safeguarded with the greatest care. As a matter of fact, the dairy business has been largely built up in the past on a "cheap basis." Cheap cows, cheap feed, cheap stables, cheap labor and cheap prices for the product. There is no argument for the low price which has prevailed for milk during the past twenty years, when we compare the price of milk with that of other perishable human foods. In other words, if the dairyman could sell the nutrients in his milk for the same price per pound that he receives for the nutrients in his meat, or the poultry man for his eggs, he would soon be a rich man. But for some reason the consumer has usually protested against any raise in

the price of milk, and yet he will pay any price the market demands for beef or other commodities, whether high or low.

It has been my privilege to note the dairy conditions in various sections of the country, particularly conditions on dairy farms where the supply of market milk is produced for cities. These investigations have shown conclusively that the conditions on a large percentage of dairy farms and in many of the city milk depots are far from ideal. Little attempt is made to supply proper light for stables, many having no windows at all, proper ventilation is generally lacking, floors, walls and ceiling are unclean and poorly constructed, stable yards show accumulations of manure and poor drainage. It is not uncommon to find horses and swine in the same stable with cows, and the manure is too often thrown through the window and allowed to accumulate near the stable and furnish a breeding place for flies, and is a source of contamination of the worst kind. The cows are rarely clean in winter on many of the smaller dairy farms, and if we collect a dozen samples of milk at random in any large city we will have abundant proof of this. Seventy-five per cent. usually show a rim of filth in the bottom of the bottle. There is a lack of facilities for scalding or sterilizing utensils. As a result of this superficial cleaning it is not an uncommon thing to find putrefied curd in the seams and cracks of the utensils, although the housewife who usually looks after the cleaning will protest that she has been doing the work for years and knows her business. Conditions in the city where milk is handled are on the average a little better, but there is a general lack of appliances for sterilizing utensils here also, and many of the practices are far from sanitary.

It is interesting to note that the conditions are about the same all over the country. For every bad dairy in New England, for example, there is one to match it in the South and in the West. Where 5,000 dairies were inspected by the Board of Health in New York city, just 5,000 were asked to clean up and make improvements. In a city in Ohio which has inspected some 2,000 dairies and given them a rating on a basis of 100 points for perfect, the average score has been about 45. In our own City of Washington about 1,000 dairies supplying milk to the city have been inspected on a similar basis and given a rating with, practically, the same result. However, there is great improvement

CONTRAST OF TWO DAIRY STABLES, THE INSANITARY AND SANITARY.

going on in all sections of the country, and the public generally has become awakened to the importance of a cleaner and safer milk supply. The health authorities of the City of Washington, like authorities in other cities, have been doing excellent work with the money and men at their command, but they have been greatly handicapped from lack of funds, laboratory facilities, etc. I think it may be fair to say in regard to the work of the Health Department in our city, that with the small appropriation at its disposal it has made an excellent showing, as conditions on the dairy farms will indicate. Cement floors have been laid, stables whitewashed, windows put in where there were none before, and more care generally expended in milking and handling the product. The muslin-curtain system of ventilation has been installed in a number of places, assisting greatly in giving pure air to the animals and improving the sanitary conditions. A number of small dairy houses can be seen which have been erected through the influence of the dairy inspectors and equipped with hot-water appliances and facilities for cooling milk. There are many conditions, however, which appear to be favorable to the transmission of typhoid germs through milk and which need to be looked after with much greater care than at present. Cases of typhoid fever are not infrequently traced to the milk supply, and very often directly to a patient who is sick, or has been sick, with this disease on the dairy farm and has not been isolated. (See illustration.)

It is my opinion that during the summer months the flies which on many dairy farms are allowed to get into the milk transmit, not only the germs of typhoid fever, but those which cause diarrheal disturbances, especially among infants. The work done in New York city shows very clearly the possibility of typhoid being carried through this medium, and hundreds of cases have been traced to this source without a shadow of doubt.

"A great deal of time and money is being spent in a war on mosquitoes; the cases of malaria reported in greater New York in 1905 were but 359 and the deaths only 52. The common house fly is much more to be feared. This so-called harmless insect is one of the chief sources of infection which in New York city causes annually about 650 deaths from typhoid fever and about 7,000 deaths yearly from other intestinal diseases." (Daniel D.

Jackson, member of committee on pollution of waters of New York city.)

Last summer a fly was captured on South Street, Brooklyn, which upon examination was found to be carrying in his mouth and upon his legs over 100,000 fecal bacteria. He had been walking over human excreta on the water front and was on his way to the nearest milk pitcher. Jackson has estimated that proper sanitation will reduce the typhoid deaths in New York city from 650 to 360 a year and the diarrheal deaths from 7,000 to 2,000 a year; this latter figure provided the germ-infected flies are not permitted to contaminate the milk supply either before or after it reaches the city. This saving of about 5,000 lives a year will also be accompanied by the additional saving of some 50,000 cases of sickness.

Since the danger of carrying typhoid fever through the agency of flies has been so forcibly demonstrated by the committee referred to in New York, it behooves us more than ever before to guard the milk supply from this source of contamination.

Imagine, if you can, the danger of a few flies which have hatched in the manure pile or pig pen and traveled about loading their legs with fecal bacteria to the extent of 100,000 or more, each; they then fly to the milk pail for a drink, where they fall in and contaminate the milk which goes to the city for consumption. To show the possibility of contamination by flies, a bacteriologist made an experiment, first catching a fly in the house. It was found that this one contaminated sterile water to the extent of 300,000 bacteria. A fly caught in the cow stable added 800,000; one caught in the pig pen added 1,000,000, and one caught around the swill barrel added 1,500,000.

Visit the dairy farms any time during the warm weather and we will find, in 99 cases out of 100, that these flies have free access to the dairy utensils, to the stable where milking is done, to the milk strainer, and very often fall into the milk after being strained ready for shipment. Is there not grave danger of flies transmitting typhoid fever through milk?

There is the most urgent need for better sanitation on our dairy farms, and it is particularly important that favorable breeding places for flies be destroyed as far as possible. More careful screening of stables and dairy houses from flies and greater care

in keeping these dangerous insects away from milk and milk utensils should certainly be insisted upon.

*Education.*—Education is the greatest factor in putting the milk business where it belongs. It has been at work more or less in the past few years and it will spread much faster in the future. There never was a time when city health officers and State and Government officials have been so active in the improvement of the milk supply as today. Our Dairy Division has given assistance to about 100 cities during the past year in improving their milk supply, and most of them have made direct application for this assistance, showing that the leaven is working, and while all this will tend to bring the conditions on the farms up to a higher level and require much greater vigilance on the part of the dairyman, in the end it will mean better prices and a better market, and be to his advantage.

*Unfair Competition an Obstacle to Better Milk.*—Up to the present time clean milk and dirty milk, milk rich in fat and milk poor in fat, have been selling in our cities for practically the same price. In fact, consumers have been very slow in discriminating between these different grades of milk. They usually look upon milk as a necessary article of food, to be purchased as cheaply as possible, regardless of quality or source of supply; if milk has a fair amount of cream and a uniform flavor no questions are asked. Thus, there has been but little incentive for the dairyman who honestly tried to supply a better quality of milk to continue to do so. In fact, the milk dealer who attempted to increase the price has been boycotted by the housekeeper and told that milk could be purchased cheaper somewhere else. We have come to look upon milk now, however, from a different standpoint, and to consider not only its content of fat and solids, but the dirt contained in it and the number of bacteria. The dairyman who persists in producing milk under insanitary conditions is arrested and fined for selling dirty milk in some of our cities as quickly as the dairyman who sells milk below the standard for fats and solids. The dairyman also has to be careful in his methods and see to it that the bacterial contamination does not exceed a certain limit when the product is delivered in the city. All this tends to fairness and equal competition and puts every dairyman on the same basis. While in the past it was possible for the dairyman with a place about as filthy and bad as could be imagined, lacking in

everything that it should have, to secure as much for his milk as a dairyman whose place was clean and sanitary and wholesome in practically every respect, in the future the dairyman who has not a true idea of dairying will gradually be crowded out of the business. Dairying will become more scientific and more business-like, employing only skilled and educated labor, dealing with profitable cows and taking pride and interest in the work. The dairyman of the future will realize more fully that the milk prepared in his cow stable is a food product, and that the surroundings should be as clean as the place where the bread is made or the potatoes are peeled.

*Responsibility of the Health Officer.*—Laws must always be in force for the wilful law breaker, the careless and the ignorant, and the public should have a right to protect itself from disease or any impure product. Some of our city health departments have perhaps been a little too radical and have not always met the producer half way. The health officer should have patience and should endeavor to point out to the dairyman his faults and give him a fair chance to improve before condemning him. Co-operating is a good deal better than clubbing. Of course it is understood that the persistently dirty dairyman must be dealt with with a firm hand, but the point I want to emphasize is that the majority of dairymen are not wilfully dirty and that they are willing to do anything reasonable. But they need to be condemned less and assisted and instructed and encouraged more. If the inspector could be looked upon as an instructor rather than an official inspector on police duty, many of the difficulties between health boards and dairymen would disappear. Such instruction should be given right at the dairy farm, with the dairyman on the spot, and it should be given by capable and practical men. The dairyman has often had good reason for objecting to inspection; for example, an inspection force was appointed in a western city recently, which consisted of an *engineer*, a *detective*, a *solicitor*, a *machinist* and an *ex-policeman*—a good example of what poor politics is doing in some of our large cities.

*Educate the Consumer.*—The education of the consumers is practically as important as the education of the producers, and until they learn to appreciate clean milk and are ready to pay a reasonable price for it, just so long are they encouraging uncleanliness, the keeping of diseased cows, and the watering and dop-

ing of the product. The consumer is therefore fully as much to blame for the present quality of milk as the producer. Why is it that cultured and well-to-do people who use good judgment about most matters give so little attention to their milk supply, which means so much not only to the health of their children, but themselves as well? To mention a case in point: Within a few blocks of my home in the suburbs of the city there is a filthy dairy, where the cows are coated with manure and the stable is about as insanitary as can be imagined. The consumers of the milk from this dairy, many of whom I know, can look out of the back doors of their houses and see these conditions any time, yet they accept this product (mixed and flavored with fecal matter) for use as a food on their tables without a word of criticism so long as it sold cheap. Ask them if they have a good milk supply and they will say, Oh, yes; we get milk fresh and warm from a little dairy down the hill! They, like hundreds of other consumers, still cling to the erroneous idea that warm milk, fresh from the cow, is good milk, regardless of whether it is clean or whether the cow is healthy.

Until the consumer appreciates the importance of having milk clean, and discriminates between clean and dirty milk, and looks upon this product as a valuable food, and insists upon its being pure and free from all contamination, and is willing to pay a reasonable price for this most valuable food, there will not be any marked improvement in the quality of the milk supply. Laws can compel the dairyman to improve the conditions on the farms, but they cannot compel the consumer to buy clean milk, nor should compulsion be necessary. There is need of improvement all along the line. The boards of health must employ competent inspectors to instruct and bring about better conditions on the dairy farms. The dairymen must appreciate more than they have in the past the great importance of producing clean milk, free from disease and contamination, and the public must be educated to demand clean milk from clean dairies, and foot the bills for this improvement. We need better milk, and if the dairymen make it good they can never make enough.

**Gen. Geo. M. Sternberg** said that the papers read in the symposium were of the greatest interest and value. There was every reason to congratulate the community upon the showing of efficiency of the filtration plant; the engineer officers in charge

should have the support of the public, and of the medical profession in particular, in their efforts to secure additional safeguards for the water supply by the installation of the necessary means for the use of a coagulant at periods of great turbidity. The coagulation method has now been thoroughly tested and found to be without objection. At the time of the preliminary discussion of the filtration project he had been much impressed by the quality of the effluent from a model coagulation filter.

But the question remains for solution, Why do we continue to have so much enteric fever in this community? The question has been partially answered by the investigation of the milk supply; if a full knowledge of the anamnesis could be had in every case, no doubt the percentage of cases directly attributable to infected milk would be still larger. But many cases may be due to other causes, as had been pointed out: the imported cases; those due to contact, easily demonstrated among laundresses and nurses; flies and other domestic insects, etc.

Only by the thorough disinfection of all the excreta in every case may the disease become extinct. It is an open question whether disinfection as commonly practiced is thorough. He had insisted, in a paper read before the Public Health Association in 1885, upon thorough disinfection of typhoid excreta, and had published efficacious and simple methods: the use of ample quantities of milk of lime, or merely large volumes of boiling water. One great source of continued prevalence is the large number of unrecognized cases and the careless handling of the excreta and clothing of these patients. Inaccurate diagnoses are not now so frequent, and the profession is more alive to the recognition of atypical cases. In this as in all infectious diseases the mild and atypical cases are the greatest source of danger. This was the cause of the disastrous spread of typhoid fever in the army camps during the Spanish-American war—the doctors failed to make the diagnosis in mild cases. The causes of the epidemic prevalence of the disease, as determined by the Reed commission, were: infected water supplies, infected soil, flies and contact. Only recently the chronic bacillus carrier has taken his place in the etiology of enteric fever.

**Dr. Kober** said that the causes and mode of dissemination of typhoid fever in the District of Columbia have been earnestly studied for a number of years, and in the light of recent investigations it may not be amiss to recall the pioneer work of the Medical Society and of individual members thereof to indicate that every point developed in recent discussions, save the influence of domestic filters and water coolers, had received consideration before.

The Committee of the Medical Society in 1894 recognized very clearly the influence of shallow wells, polluted Potomac water, infected milk, box privies and general insanitary factors, and made suitable and intelligent recommendations.

Dr. Kober's investigation in 1895 confirmed in every particular the conclusions reached by said Committee and developed two new facts, viz., the percentage of imported cases and the agency of flies in the transmission of the disease. The subject of impure ice received attention, and on page 281 regret was expressed that "the overcrowded state of the laboratory did not permit the extension of this inquiry into soda and carbonated waters, many of which are doubtless derived from polluted sources."

The danger of infected hands, clothing and contact infection was pointed out on pages 259, 260; the possible danger from fruit and vegetables which are eaten raw and which may have been infected through the medium of fertilizers and infected water was referred to on pages 258 and 281. The danger from milk was discussed on page 267 and emphasized by a tabulation of 130 milk-borne epidemics from all parts of the world, in three of which the infection was spread through ice cream prepared in infected premises.

In discussing the bacteriological findings of well water, to which a number of cases in the northeastern section had been traced, he had said, on page 267, that another and perhaps equally fruitful source of infection was the fact that many residents kept milch cows which were permitted to roam at large over the commons and graze along the banks of a sluggish stream that received the contents of the large boundary sewer. He had seen a herd of fourteen milch cows wading in this polluted stream, and it was perfectly conceivable that the germs of typhoid fever, if present in sewage, might adhere to the teats and udder of the cow and thus contaminate the milk supply. Several cases in the city, one in the central portion, were traced to milk from this infected locality. At all events, the evidence on this subject appeared to him sufficiently weighty to formulate the following recommendation: "I earnestly recommend to the public the thorough disinfection of the excreta from all typhoid fever patients and greater care on the part of those connected with the sick, together with boiling the water and milk supply."

In 1902 Dr. Kober prepared a monograph of 235 pages on "Milk in Relation to Public Health," Senate Document 441. His summary on page 178 read as follows: "It is interesting to note that of 195 epidemics of milk typhoid, 99 of scarlet fever and 36 of diphtheria, a total of 330 epidemics, 243 have been recorded by English authors, 52 by American, 14 by German and 11 by Scandinavian, and 5 each came from Australian and French sources. This is probably due to the fact that the English and Americans usually consume milk in a raw state, while in Germany, France and the continent of Europe milk is rarely used without previous boiling. It can scarcely be an index alone of the greater interest taken in England and the United States in preventive medicine."

Theodore Horton, writing to the *Engineering News*, November 1906, says "The influence of the milk supply in the causation of typhoid fever in the District has been very carefully studied by Geo. M. Kober, M. D., during the past ten years, and as a result of this investigation he estimates that fully 15 per cent. of the cases of typhoid in the District may be attributed to milk infection."

As a matter of fact Dr. Kober's estimate had heretofore been that about 50 per cent. of the cases of typhoid fever in the District were due to water, including ice and commercial waters; about 15 per cent. to milk; 15 per cent. to importation and about 20 per cent. to the agency of flies, personal contact and the consumption of fruit, vegetables and shell fish from infected sources. Every one of his students knew that he had objected for over 20 years to the consumption of raw milk and cream, also to iced drinks, not only on account of the danger of impure ice, but also because of the injury to the digestive functions.

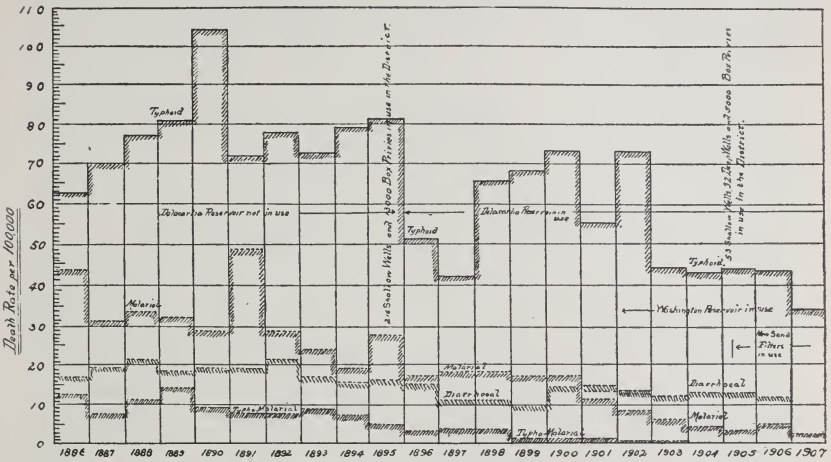
The influence of environment, of the malarial cachexia and other predisposing factors received attention on pages 261 and 272, and his fifth recommendation, on page 282, read as follows: "Such measures as may be necessary to improve the sanitary condition in the lower part of the city, along the Potomac and Eastern Branch, looking to the reclamation of stagnant and polluted marshes and the prompt disposal of sewage."

Dr. Kober hoped the Society would pardon this extended reference to his own work and that of the Committee of 1894. This presentation seemed necessary, however, to show that we had not been at all one-sided in our views, and had not been groping in the dark, but had been mindful of the many perplexing factors which enter into the dissemination of the disease.

Moreover, in the face of the fact that he was the first to connect the agency of flies with the spread of typhoid fever, and had, indeed, great difficulty to interest Professor Howard in the investigation, it was not a pleasing reflection to have this work entirely ignored in official reports. Nor can we approve of the sentence in a forthcoming Government report which attributes Dr. Magruder's interest in the milk question to the work done by the typhoid fever board of 1906, when, as a matter of fact, Dr. Magruder's committee urged the sanitary inspection of the dairies as early as 1894. Finally, Dr. Kober did not hesitate to resent the omission in the forthcoming report of all reference to his summary of 330 milk-borne epidemics, published in 1902.

Consider next the question whether the Medical Society and individual members thereof were justified in attributing a considerable portion of typhoid fever to polluted Potomac water, and in urging the expenditure of vast sums of money for its purification. Since he was, perhaps, the first to implicate the Potomac water and to trace the effects of the Cumberland epidemic upon

Washington in 1890, he is willing to accept whatever blame or credit attaches thereto.




The accompanying chart copied from Mr. Horton's diagram in the *Engineering News*, and which contains similar data collected and presented by Dr. Kober to the Medical Society, February 23, 1898, shows conclusively that the typhoid fever rates were highest when the Potomac water was served in a raw state, without any preliminary sedimentation whatever. Major Cosby has told us that about 87 per cent. of the bacteria are removed by sedimentation alone, and it was this same line of argument before the Senate Committee in 1898, which resulted in the completion of the tunnel and in the installation of the McMillan Reservoir. Bacteriological examinations conducted by Mr. Longley have since shown that the average number of germs for one year in the raw water is diminished from 4,900 at the intake to 3,200 in the Dalecarlia Reservoir, from 3,200 to 700 in the Georgetown Reservoir, from 700 to 670 in the McMillan Reservoir and from 670 to 29 in the filter beds.

The Dalecarlia Reservoir was not in use as a sedimentary basin from June 20, 1888, to July 28, 1895. Mark the comparatively high typhoid fever rates, especially during the Cumberland epidemic, which started in December, 1889, and resulted in the highest rate ever reached in this city, viz., 104 per 100,000. Mark the decline, especially after the installation of the McMillan Reservoir in 1902. The sharp rise in 1902, in the light of our knowledge of bacillus carriers, may possibly be explained by the assumption that during the construction of the tunnel and reservoir more or less pollution took place by careless workmen.

The diagram is also very instructive in showing a remarkable decline in the deaths from malarial and typho-malarial fevers and diarrheal diseases. Personally he had no doubt that many of these cases were really typhoid fever, and that the decrease of typhoid fever is, in fact, very much greater than appears from the mortality returns.

On the whole, there can be no question that the purifying effect of sedimentary basins, as expressed by Professor Sedgwick, "was immediately to remove from the polluted water of the river a large percentage of any typhoid fever germs present at the intake, and thus to forestall to a remarkable and unforseen extent the burden of removal which the filter was expected to bear."

It should also be borne in mind that during the year 1906 typhoid fever prevailed in Cumberland to an unusual extent, but, contrary to the experience of 1890, we had at least no increase, and as Dr. Magruder expressed it, "The filter stood as a guard between the inhabitants of Washington and Cumberland."

The diagram clearly indicates that we have been reaping for some years the expected decrease from efforts at purification. The general death rate from typhoid fever during 1906 was 49.3 per 100,000, which is less than one-half the rate in 1890. The further reduction in 1907 to 34.59 per 100,000 may in part be attributed to the closing of wells in June, 1907. Dr. Kober had urged this very step upon the Commissioners in 1906, but Dr. Woodward, in a very proper and conservative spirit, recommended reference of the entire subject to the Public Health and Marine Hospital Service. The Board thus appointed recommended what had been repeatedly emphasized by members of the local profession, viz., the immediate closing of the wells.

Dr. Kober had always been in favor of securing the highest degree of bacterial efficiency of the filtration plant, and since it has been shown that this cannot be obtained during periods of great turbidity without the use of a coagulant, he expressed the hope two years ago that the recommendation of the engineer of the plant may be acted upon, and the Society may safely indorse Major Cosby's recommendation.

While Dr. Kober confidently expects further improvement in the typhoid fever situation, he fears that Washington, like other Southern cities, will always have a somewhat higher rate than Northern cities.

One reason may possibly be found in the fact that heat and humidity tend to produce profuse perspiration; in consequence of this excessive cutaneous function the blood is determined more or less to the periphery, resulting in a physiological anemia of the internal organs and increased susceptibility to infection. Dr. Woodward's suggestion of the increased quantity of water drinking incident to our climatic condition appeared to be of great value.

It is also a noteworthy fact that during the past ten years the average typhoid death rate among the colored population was 76.4, as compared with 47.4 for the whites. The factor of environment and other predisposing causes is plainly revealed by the undue fatality in the colored population. Many of these factors were referred to in Dr. Kober's article on the Health of Washington (Charities, March 3, 1906). While they may be found among the poor and ignorant classes everywhere, a careful study of the situation shows that uplifting influences and higher standards of living are especially indicated in the Afro-American. That his physical welfare responds promptly to improved environments is strikingly illustrated by a decrease in his general death rate from 42.86 in 1875 to 28.81 in 1906. Now that we have a good water supply, we should not cease in our efforts in sanitation. Prompt disinfection of typhoid dejecta, suppression of flies, clean back yards, basements, cellars, alleys, streets and vacant lots, the removal of slums, the abandonment of every public and private well, safeguarding the water supply at farms, as pointed out by Dr. Magruder, stringent laws regulating the production and sale of milk and cream and greater attention to hygiene and sociological questions in schools and colleges, will contribute much to the removal of the so-called residual causes of typhoid fever.

**Dr. Woodward** said that while it would be extremely interesting to know the causes of typhoid fever in the District of Columbia, yet that was not primarily the question that had been so long before the public. What the community would like to know, in the first place, is the reason why typhoid fever prevails more in the District of Columbia than it does in many other localities. When the causes for the *undue* prevalence of the disease have been discovered and so far as possible removed, and the typhoid fever case rate and death rate in the District reduced so as not to exceed the corresponding rates in our most favored communities, then we will be in a better position to approach the more difficult problem of determining why typhoid fever prevails at all, and in a much better position to approach the still more difficult task of eliminating all typhoid fever whatsoever. The problem as stated above, Why is typhoid fever more prevalent in the District of Columbia than in other communities, was clearly the problem before the Medical Society in 1894, when it inaugurated the campaign against the disease, and the clear realization of the problem to be solved contributed very largely, no doubt, to making the work of that committee so thorough and the results as complete as they were. It may safely be said that aside from the one or two new facts brought to light by Dr. Kober's investigations and to which Dr. Kober has already referred, no material fact has been disclosed by any subsequent investigation, that was not anticipated in the report of the Medical Society.

In the reports upon the results of the several investigations

that have been made to determine the causes of the undue prevalence of typhoid fever in this District, the investigators have told us that a certain number of cases was imported. This, however, does not account for the undue prevalence of the disease, since in other communities, too, certain cases are undoubtedly imported. They have told us that a certain number of cases was due to direct contact; true, but in other communities also, direct contact must yield a certain number of victims. They have told us that a certain number of cases arose from the use of milk, but they have shown no reason for believing that the milk of this community is more liable to carry infection than the milk of other places. The difficulty lies in the fact that an effort has been made to discover the causes of typhoid fever in the District of Columbia, but not to discover first the reasons why typhoid fever should be more prevalent here than elsewhere. Coincident with the investigation into the causes of the prevalence of typhoid fever in this District, there must be, and should have been, corresponding investigations, equally extensive, into the causes of the prevalence of the fever in other cities, so that differences may be ascertained and local conditions responsible for the undue prevalence of the disease may be remedied, if remediable.

In discussing a problem of this kind it is essential that we weigh well the words we use. It has been said, for instance, in this very discussion, that there is but one cause for typhoid fever, and that is the typhoid fever bacillus. Dr. Woodward was utterly unable to agree with any such proposition. The typhoid fever bacillus alone does not cause and cannot cause typhoid fever. It is only when the bacillus finds suitable lodgment in the body of man that typhoid fever develops; therefore man is equally as essential to the existence of typhoid fever as is the bacillus. This might be regarded as a mere technicality with respect to the use of words were it not for the fact that there is reason to believe that not every one who is exposed to infection by typhoid fever develops the disease. Before the disease will develop, there apparently must be something peculiar in the conditions and circumstances under which the germ effects lodgment, and therefore such conditions and circumstances are themselves quite as much causes of typhoid fever as is the typhoid fever bacillus. It seemed to Dr. Woodward that we have been so absorbed in our pursuit of knowledge with respect to the bacillus that we have quite neglected the study of the conditions that permit the growth of the bacillus after it finds entrance into the body. From a practical standpoint, too, if typhoid fever can develop only when the typhoid fever bacillus and the human system come into conjunction, anything that brings them into conjunction is a cause of typhoid fever, and the causes belonging to this class are of vital importance; if we can sever any of the connecting links between the typhoid fever bacillus and its prospective victim, we can effectually prevent the occurrence of the disease.

As another illustration of inaccurate speech with respect to matters of this kind, we may consider the statement that was made that certain water coolers that had been the subject of investigation were found to be infected. Contaminated, from all evidence, they undoubtedly were, but the results of the investigation, so far as the paper divulged, did not reveal the presence of any infective organisms; the water coolers, therefore, could not properly be said to be infected. The very general failure to discriminate between contamination and infection leads to erroneous conclusions with respect to the significance of bacteriological examination. Drinking water, we are told by most eminent authority, should not contain more than 100, or, possibly, more than 500 bacteria to the cubic centimeter; if the bacteria are in excess of this number, then the water is an unsafe drinking water. Yet it has been conclusively shown, with respect to our own water supply, that during the periods when the water contains the largest number of bacteria, the city is most nearly free from that disease which, of all others, is regarded as a water-borne disease, namely, typhoid fever. It was pointed out, for instance, by one of the previous speakers, that about the close of the year, by reason of a combination of circumstances, the bacteria contained in our water supply were very much more numerous than they had been since our filters had been installed, and we were shown certain peaks in the diagram that had been prepared to illustrate the bacterial contamination of our water supply that looked truly quite alarming; yet the number of cases of typhoid fever reported during the month of January just past was much lower than the number reported during the corresponding period of the preceding year, and the number reported thus far during the month of February (February 1 to 25) is extremely low as compared with the record for the corresponding period of 1907. The presence of the colon bacillus has been held up as evidence of dangerous contamination of drinking water so often that the colon bacillus has become a bugaboo with which to frighten the uninitiated. Most persons in the community, and probably many in our own profession, would hesitate long before drinking water that they knew to contain colon bacilli, and yet all of us are literally reeking with such bacilli. I plead now only for the rational interpretation of bacteriological findings. The number of bacteria means nothing unless we know the varieties which go to make up the number, or, at least, know with more or less definiteness their origin.

It is impossible now to go at length into the analysis of recent figures relating to the prevalence of typhoid fever in the District. The significance of such analyses varies so widely with the personal equation that they must be studied and adjusted with great caution before the reader is in a position to draw intelligent conclusions from them. Evidence that to the one investigator might

seem sufficient to justify the charging of a case of typhoid fever to milk infection or to some other specified cause would seem to another observer to be wholly inadequate to warrant it, and so the results of the two investigators, both equally competent and honest, would vary. The practice in the Health Department of this District has been to assign no case of typhoid fever to a given variety of infection unless the evidence sustained the conclusion beyond a reasonable doubt ; otherwise, the cause of the case has been entered up as unknown. Another investigator, accustomed to rely on merely a predominance of evidence to justify the charging of a case to one cause or another, would obtain figures quite different from those obtained by the Health Department. The percentages of cases charged by the Health Department to direct contact and to milk infection have been, therefore, much lower than the percentages charged by other investigators to these causes. Of all cases reported during the calendar year 1907, concerning which definite information could be obtained, 925 out of a total of 945, the number charged to infection outside of the District of Columbia was 191. Of the remaining cases, those of presumably local origin, 64, or 8.7 per cent., were attributed to direct contact, 27, or 3.7 per cent., to milk infection, and 780, or 87.6 per cent., to unknown causes. The most striking feature of last year's typhoid fever record was the remarkable decrease in the prevalence of the disease among the colored population. From 1906 to 1907 the fall in the number of cases of typhoid fever reported among white persons was only from 796 to 735, while the fall among the colored was from 330 to 210. The fall in the case rate was for the white population from 344 per 100,000 to 314, and among the colored population from 347 to 218. The reason for the remarkable decrease in the prevalence of typhoid fever among colored persons last year has not yet been ascertained, but it would not be at all surprising if when it is ascertained, if it ever is, a flood of light is thrown upon the entire question as to the cause of the undue prevalence of typhoid fever in the District of Columbia. The essential fact of the present situation is that the typhoid fever case rate was lower last year than at any other time since cases of typhoid fever have been reported, and that the death rate, 34.6 per 100,000, is lower than any other death rate since the agitation concerning the prevalence of typhoid fever in the District of Columbia first began.

Dr. Kober has referred to the undue prevalence of typhoid fever in southern cities. Not only may the undue prevalence of the disease in such cities be attributable, as Dr. Woodward had suggested to him, to the fact that the greater intensity of heat in the south leads to the ingestion of larger quantities of water than are consumed further north, and, therefore, so far as water-borne typhoid fever is concerned, to increased chances of infection, but there are other causes that must be considered. Intensity of heat

and the long duration of the heated season probably lead to a more rapid and more extensive lowering of the water in the streams and wells than occurs in cooler regions, and thus lead to a greater concentration of infectivity, if the water in such streams and wells is infected. The temperature of the water in such streams and wells may be better suited to the life of the typhoid fever bacillus than is the temperature of northern waters. Moreover, owing to the greater duration of the summer season, the earlier advent of spring and the delayed departure of autumn, the fly season is longer, and the period during which the diet of the people consists largely of uncooked articles is correspondingly extended. The chances of infection, are, therefore, correspondingly increased in so far as relates to infection through foods. Still it would be but poor comfort to know that because Washington is a southern city it must continue forever to pay up its death toll to the typhoid fever Juggernaut; the problem must not be solved in that way. But the problem is not yet solved, nor, did Dr. Woodward believe, is it likely ever to be solved until the investigation is taken up along broader lines than any that have yet been adopted; that is until the investigation into the causes of the undue prevalence of typhoid fever in this District is made to include an investigation into the causes of the prevalence of typhoid fever elsewhere, so that by a process of comparison and exclusion the cause for the excessive typhoid fever rates in the District of Columbia can be ascertained.

**Dr. H. J. Washburn,** of the Department of Agriculture, said that since the typhoid fever organism thrives so well in milk at suitable temperatures, the question very naturally arises, What dangers to humanity do the various dairy products present through the possibility of their harboring typhoid bacilli and later conveying them into the digestive tracts of the consumers? In order to determine the length of time that typhoid bacilli will live in butter under common market conditions, the Pathological Division of the Bureau of Animal Industry has recently made up some samples of butter which were known to contain living typhoid organisms. This material was prepared by adding a quantity of typhoid culture, scraped from a thrifty growth upon glycerin agar, to the cream from which the butter was to be made, just before the churning. After churning, the buttermilk was worked out, salt in the usual proportion was added and the butter was next packed securely in small glass jars, which were placed for storage in an ice chest at the laboratory.

Tests of this butter by plating have been made every two or three days since its manufacture, and the experiment is still in progress, as the ultimate duration of the survival of the typhoid bacilli has not yet been determined. Thus far we have found that typhoid bacilli retain their vitality under the above conditions for at least sixty days, and probably longer.

We must not on this account charge the poor dairy cow with being an agent in the spread of typhoid fever, because she has troubles enough of her own just at present; still, whenever untraceable outbreaks occur it might be well, while searching for a possible source, to bear in mind the fact that butter offers a satisfactory shelter to typhoid bacilli whenever they are allowed to come in contact with it, and an investigation of the butter supply of the several affected families should therefore be made in all cases in which no other infection can be determined.

The house fly is recognized as a dangerous conveyor of infectious material, and, if permitted to do so, there is no place to which he would more readily carry typhoid infection, should he become smeared with it, than into a milk pan or a cream vat. No doubt you have all seen flies struggling in the milk pitcher or the dairy pans trying to save themselves from drowning. Ordinarily they are harmless to the consumer whether they crawl out or drown. It is only in the exceptional cases of their contamination with some infectious disease that serious results may follow.

Living typhoid bacilli mixed into salted butter and then placed in cold storage will retain their vitality for at least two months, offering through all that period of time a menace to any who may eat of the product which supports them. Sterilization of the cream is therefore indicated in all cases in which there is any possibility of typhoid infection. It has been found that milk containing 1,500,000 typhoid bacilli per cubic centimeter when heated to 140 F. (60 c.) for thirty seconds will lose all but about 36,000 of the organisms. If subjected to this temperature for one minute all but about 9,000 will disappear and when this degree of warmth is maintained for two minutes all of the typhoid bacilli are destroyed. Increasing the heat to 150 F. (65.5 c.) results in the destruction of all typhoid bacilli in thirty seconds, while a temperature of 160 F. (71 c.) will sterilize the product so far as typhoid bacilli are concerned, in ten seconds. It will be seen from this that the typhoid bacillus is very easily destroyed by the action of heat. In this respect it closely approaches the tubercle bacillus; at the same time, it is not so readily destroyed if covered with fluids and is, therefore, quite as hard to remove from dairy products. Heating milk or cream to 140 F. (60 c.) for a period of two minutes will effectively destroy both of these deadly parasites, and will leave the milk and the butter manufactured from it safe as articles of human food.

**E. C. Schroeder,** U. S. Agricultural Experiment Station, Bethesda, Md., said that to prove a negative is difficult. The need to do so in the field of medical science occasionally arises when an attractive theory has been illogically elevated in the minds of many persons to approximately the rank of an established fact. The alleged rôle of water in the dissemination of typhoid fever is a case in point.

The papers presented by Dr. Wiley, Major Cosby and Mr. Longley show conclusively that the only condition which gives the remotest semblance of truth to the theory that the water supplied the City of Washington through the regular water mains may be a source of typhoid infection is the infrequent discovery in it of a few colon bacilli.

The significance of colon bacilli in water and elsewhere must not be over-estimated; they inhabit the intestines and are present in enormous numbers in the feces of all animals and all persons. The typhoid bacillus is expelled by comparatively a small number of persons only and not at all by animals. Human feces, most of which contain no typhoid bacilli, are used to a small extent as fertilizer; the feces of domestic animals are abundantly spread over the Potomac watershed for agricultural purposes. Hence, millions of colon germs swept from the soil into the water are but poor inferential evidence of the presence of a single typhoid bacillus.

The sewage pollution from most small towns along the banks of a river is not direct; small towns rarely have an elaborate system of sewers through which their sewage can be emptied directly into an adjacent river.

The watershed from which city water flows is the territory from which a large portion of the city milk supply is derived; hence, unusual prevalence of typhoid fever in this territory means unusual chances for the infection of milk and dairy products, as well as unusual chances for the infection of water. Typhoid bacilli grow abundantly in milk without greatly changing its taste and appearance and they die in river water.

The more the facts are examined, the more the conclusion seems warranted that the alleged relationship between the water supply and the occurrence of typhoid fever is a lame hypothesis hobbling on broken crutches.

The evidence of the relationship between the milk-supply and typhoid fever can be shown to be more substantial. The United States Public Health and Marine Hospital Service published a report in 1907 on the origin and prevalence of typhoid fever in the District of Columbia,* in which some very significant figures are given. The total number of cases included in the report is 866; of these 10 per cent. were traced to milk and 6 per cent. to contact, and not one case to water. Among the 866 cases more particular attention was given to 747, which were actually contracted within the limits of this District and not imported into it. Among the latter, 79 cases were traced to infected milk and 6 to infected ice cream; that is, a total of 85, or 11⅓ per cent. of the 747 specially studied cases, were traced to infected dairy products. The following analysis of data presented by the United States

*Hygienic Laboratory, Bulletin No. 35, Feb. 1907.

Public Health Service will show that the charge to infected dairy products is very conservative.

The source from which 747 persons who became affected with typhoid fever derived the infection remained undetermined for 608, or 81⅓ per cent. Among the 747 there were 488, or 65⅓ per cent., who used milk as a beverage, 90 who used milk on fruit and cereals, but not as a beverage, and 65 who used ice cream but no milk; that is to say, 643, or 86 per cent. of 747 persons who contracted typhoid fever, used, presumably, raw dairy products before the disease developed. Butter is not included among the dairy products here named, notwithstanding the fact that its opaque, bland, moist character makes it a medium unexcelled among articles of food for the preservation of the life and virulence of pathogenic organisms.

The large number of persons among the 747 who used milk as a beverage before they became affected with typhoid fever becomes still more significant when we know that only 32, or 3 7/10 per cent. of 866 cases of which the 747 form a part, were under the age of 5 years; in other words, most of these milk drinkers had well passed what may be regarded as the milk-drinking period of life.*

When we take into consideration the probable average use of milk as a beverage by persons between the ages of 10 and 40 years, the time of life during which infection with typhoid fever occurs with the greatest frequency, the fact that 13 persons used milk as a beverage out of every 20 who contracted typhoid fever in the District of Columbia during a period of five months, alone gives us good reasons to suspect milk as being a common vehicle for the dissemination of typhoid bacilli.

Add to this the important figures of Dr. George M. Kober,† who found on tabulating 195 epidemics of typhoid that evidence could be obtained to show that in 148 the disease had prevailed on the dairy farms, and the conclusion that we must look to infected dairy products to account for the occurrence of typhoid fever becomes almost irresistible.

The numerous direct and indirect ways in which typhoid bacilli may be introduced into milk, in which they can live and multiply, from persons mildly affected with typhoid, from convalescents, from apparently healthy carriers of the germs, etc., cannot be discussed for lack of time.

A few words about the movement of bacteria and other microscopic bodies in milk may be interesting, since they will show clearly and absolutely that infected milk means both infected cream and infected butter.

When a sample of milk is rotated in a centrifuge it divides into sediment, skim-milk and cream. The sediment of commercial

* The figures given are from Hygienic Laboratory Bulletin No. 35, pages 14, 17, 20, 42 and 61.
† B. A. I. Circular No. 114, page 20.

milk consists largely of leucocytes, a little epithelium, bacteria and fragments of vegetable matter. If we discard the sediment and skim-milk and suspend the cream in pure sterile water, and rotate this mixture of pure cream and water in a centrifuge, we get a second sediment, from $\frac{2}{3}$ to $\frac{3}{4}$ as abundant as the first, composed of leucocytes, fragments of vegetable matter and bacteria. If we discard the second sediment and the water, and suspend the now washed cream in a fresh lot of water, and rotate the mixture in a centrifuge, we have a third sediment, from $\frac{1}{3}$ to $\frac{1}{4}$ as abundant as the first; in it the leucocytes are more or less broken, fragments of vegetable matter are absent, but bacteria are as plentiful, relative to the quantity of sediment, as in the first sediment obtained.

Plainly, the sediment in milk is no measure of the quantity of foreign impurities it contains in the form of bacteria, leucocytes, fragments of vegetable matter, etc., because the quantity of this material which rises with the cream is as great, and even greater, than that which collects as a sediment, and that means, simply, when milk is infected with typhoid bacilli or other infectious organisms the infection can be concentrated in the cream but not removed by sedimentation, separation or centrifugalization.

We have established definitely that the presence of tubercle bacilli in milk means their presence in both the cream and the butter made from the milk, and no apparent reason has been found to indicate that the case would be different if we should substitute typhoid for tubercle bacilli.

**Dr. Woodward** said he would like to call attention to a statistical fallacy that was apparent from the deduction that had been drawn from certain figures that had just been presented. Taking a certain number of cases of typhoid fever of unknown origin, it was found that a very considerable percentage of the patients had consumed raw milk before being taken sick, and it was argued that therefore the consuming of milk probably bore some relation to the occurrence of the disease. A similar inquiry, however, with respect to patients suffering from rheumatism, pneumonia, or any other disease, might show the same percentage of persons who used raw milk prior to the onset of the illness; since the use of raw milk is very common, such figures could hardly be offered as evidence to show that the use of milk had anything to do with the onset of any of the diseases named. The figures that are needed are not figures showing the percentage of patients who used raw milk prior to the onset of the illness, but figures to show the percentage of persons who used raw milk and who subsequently developed typhoid fever, as compared with the percentage of persons who did not use raw milk and who subsequently developed that disease. In order to be of any considerable value, however, these would have to go further and show the relation which the quantity of milk consumed bore to the occurrence of the

disease; that is, whether among milk drinkers the disease was more frequent in proportion to the quantity of milk consumed.

With respect to the clarification of the public water supply, Dr. Woodward had already pointed out that the considerably increased turbidity in the water during the month of December was not followed by any increase in the number of reported cases of typhoid fever, and this observation coincides with previous experience. The clarification of the water beyond the point to which it is now clarified must, he believed, be considered as of no hygienic importance; esthetically it may be desirable, just as the adornment of the city with magnificent monuments and statues might be so considered. A city, however, like an individual, must measure the cost. The question is, can the community afford to put one hundred thousand dollars, or anything like that sum, in the installation of clarification works, and undertake large annual expenditures for maintenance, so long as the city is absolutely without a public bath, so long as it is as cramped as it is for public play grounds, and so long as there is need for such large expenditures for the improvement of its public school buildings?

If clarification is to be undertaken, then the suggestion made that it be accomplished by the construction of additional reservoirs must be most carefully considered before any project is entered upon. The construction of such reservoirs, by increasing the period of sedimentation at all times and by permitting the water from the river to be shut out during periods when the river is excessively turbid, would accomplish everything desired in the way of clarification. The construction of such reservoirs would, moreover, in addition to accomplishing that result, provide a reserve water supply upon which the city could draw in the event of an accident to the conduit between the intake and the reservoir system. It is a well recognized fact that there is now a very narrow margin of safety with respect to this matter, and that in the event of an accident to the conduit the community would, until repairs could be made, have to practice the utmost economy in the use of water, or else have to suffer a water famine. The erection of a plant for the addition of a coagulant to our water for the purpose of purifying it, would accomplish nothing more toward clarifying our water than would additional reservoirs, and would accomplish nothing whatsoever with respect to safeguarding the community against such a catastrophe as that just referred to.

**Dr. Reyburn** spoke of his personal observations of the condition of the Potomac River and its tributaries at Cumberland and the environment, and expressed his opinion that the utmost care should be continued to purify the water supply here so long as such filthy conditions exist up the river.

**Mr. Kastle** said it was not well to lose sight of the difference between 93.2 per cent. and 99.2 per cent. bacterial efficiency of

the filters, which difference has existed and is expected to occur during times of excessive turbidity. There may be danger in this difference. During the time of high bacterial efficiency of the filters, the typhoid rate has been shown to have fallen; this cannot be attributed to any great improvement of conditions on dairy farms. The polluted character of the water in springs and rivulets on these farms has been clearly pointed out and insisted upon; surely the water of the river fed by all these polluted sources cannot be above suspicion. He thought, therefore, that the use of a coagulant at necessary periods should be insisted upon.

**Mr. M. O. Leighton** spoke of the agency of dairy-farm water supplies in maintaining typhoid fever in the District of Columbia, and said that to those who have investigated rural typhoid conditions in Maryland and Virginia the unusual prevalence of typhoid in this District, should not be surprising. It is probable that this region, especially in the valleys of the Potomac and Shenandoah rivers, has sustained a continuous epidemic ever since the war between the States. The entire country was seeded with the specific organisms of this disease by the two armies.

Recent sanitary investigation of the Potomac basin disclosed a surprising prevalence of a febrile disease among the natives, so common in its occurrence that its ordinary course does not occasion even a passing remark. The disease is variously designated, according to the usual country nomenclature, and of a character which, it is more than likely, would, in the majority of cases, if diagnosed according to up-to-date clinical and pathological methods, readily be pronounced as true typhoid. There are, of course, many serious cases, but their proportion is small when compared with the number of mild ones. It may be that the people in the region have acquired a partial immunity.

It is a rather uncommon thing to find ideal domestic water-supply conditions in this region. A casual trip through the country will readily give one the impression that excellent opportunity for the distribution of water-borne diseases is afforded. Summing up the above, we have, 1st, a history of abundant typhoid infection during the years 1862 to 1866; 2d, the history of a people who are so accustomed to endure this febrile disease, probably typhoid, that its presence does not excite unusual comment; 3d, a primitive condition of local water supplies. All of these premises afford a situation quite conducive to the maintenance of general and continuous infection.

It is important to note, in the face of the facts above recited, that a large part of the Washington food supply is derived from a part of this area. I refer, of course, to milk and raw vegetables, but especially to milk. It may not be impossible to maintain typhoid conditions at a dairy farm and at the same time to preserve the purity of the milk supply; but we all know that in 99

per cent. of the cases there will be some transmission to the consumer. It is not necessary for me to recount the various avenues by which typhoid infection on any dairy farm may be communicated to the milk. It will be agreed that the two important courses are: 1st, directly by the patient himself, and, 2d, through an infected water supply used for washing, cooling and other purposes. Under the most stringent regulations it would be a difficult matter to locate each mild case of typhoid on a dairy farm before the patient has had opportunity to contaminate the milk. It would require vigilance that we cannot command at present. We can, however, insist that the water supplies on dairy farms shall be pure. Under our present laboratory methods, the ascertainment of an infected condition in such a water supply is not a difficult matter. It is also easy to prohibit the use of such supplies, and to enforce the injunction.

Everyone will agree that such an infected water supply on a farm is an excellent agent for keeping the disease prevalent generation after generation. Those who are ill today cause the infection of the water supply, which, tomorrow or next week, will communicate the disease to someone else, and the process may be repeated indefinitely. Statistics on this point are so conclusive that it would be unprofitable to review them in this company. Abandonment of polluted supplies on the farm will therefore serve to decrease rural typhoid, and thereby will decrease the danger from milk infection. I know of no one practicable measure that will be so immediately helpful as the minute examination of these water supplies and the abandonment of those found to be infected or subject to infection. This will not solve the whole problem, of course; but, while we are urging other reforms, while we are carrying on a campaign of education, the effects of which must be fairly remote, we can, by simple, well-known methods, eradicate one of the most prolific agents by which typhoid fever is communicated through milk supplies.

Clean stables and dairy appliances are much to be desired, but such provisions, in the face of the insidious sources above mentioned, will be useless. Pasteurization is an effective remedy, but we know that this measure, however praiseworthy, will not be generally accepted at once. It is something that cannot be enforced under the present legal provisions. We can, however, undertake the careful and frequent examination of the water supplies on the dairy farms and thereby eliminate at once a very bad feature.

**Mr. Longley** said, that it had been a source of the greatest gratification to those in charge of the operation of the filtration plant to see the wholesome appreciation and approval of the quality of the filtered water shown in the presentation of this question before the medical society.

One question proposed for discussion was whether the expendi-

ture of 3½ million dollars for the filtration plant had been justified. This hinges on the concensus of opinion regarding the degree of blame attached to the old Potomac water supply for the typhoid in the District of Columbia. It has been pointed out that the blame was much less than had always been supposed, and to this conclusion all will agree who have studied the question. The question of justifiability proposed above, however, implies the assumption, that the water had not been *at all* to blame, and this assumption, in view of all the evidence, is entirely untenable. The visual evidence of sewage in the river at Cumberland and Hagerstown; the laboratory evidence of sewage pollution in the river water; Dr. Kober's investigation some nineteen years ago; and the result of human experience elsewhere with polluted water: all these facts point clearly to the unfiltered Potomac water as a possible and a most probable source of some typhoid infection, and therefore to the justification of the expenditure which has effected the removal of that risk.

Although the typhoid fever death rate for 1906 was no less than that of the year before, the year 1907 saw a decrease over 1906 of 30 per cent. This is a peculiar and unexplainable fact that has repeated itself in the history of many cities that have installed water-purification plants. If this decrease was due to the use of the filtered water, as it seems to have been in some measure, at least, the justification as indicated by the decreased typhoid rate will be much more evident by a retrospection five years from now than it can be made at the present time by the most elaborate investigations.

Another question was as to the justifiability of the proposed further expenditure of $100,000 more or less for the perfection of the quality of the filtered water under most adverse conditions.

At the outset it is necessary to remember the middle ground we have taken, that seems consistent with the relation of Potomac water and typhoid, i. e., that Potomac River pollution does carry some danger to the public health. That being so, high counts in the filtered water are obviously more dangerous than low ones.

Just what is the significance of these high counts? The science of water bacteriology is not far enough advanced for that to be clearly determined, but all we do know inclines us to look upon high counts as proportionally more dangerous than low ones. During the months of December and January, too, B. coli was present more frequently than in summer. The primary object of the filtration of this supply was to remove bacteria. While views of the necessity therefor have been *modified* they have not been entirely changed, and we still want to remove bacteria. Some years ago there were long-drawn-out discussions, participated in by some of the members of this Society, over trifling differences in efficiency of different systems of filtration, and it was maintained that it was the number of bacteria left in the water that indicated

the danger, and probably in proportion to this relative number. In view of the evidence, therefore, is it not desirable to eliminate these high counts that have occurred as shown, and that will occur again, over and over, with only our present means of purification?

The means for effecting this improvement are definitely known. A year of experimentation, with quite an elaborate plant, has shown the advantages of the best method, and the glaring defects of others, and has justified the conclusion that the quality of the filtered water, the year round, under any condition of the river water, may be controlled and kept down to the fine standard set during many of the favorable months of operation.

Greatly increased storage capacity in the reservoir system has been suggested as a substitute for coagulation. If of sufficient magnitude, it would serve the same purpose perfectly. But there are two potent arguments against it. Increased storage could be obtained probably only in connection with the project for a new and additional aqueduct, which must some day be built. If the project should be advanced with even only the most reasonable delays, it would be twelve or fifteen years before its consummation. The other argument is one of expense. A conservative estimate would place the original cost of storage twenty times as much as for coagulation, and the interest charges on the investment for the former probably two or three times as much as the proposed annual expenditure for maintenance and operation of the latter process.

**Dr. Henry G. Beyer,** Medical Inspector, U. S. Navy, had listened with the greatest interest to the different speakers who had taken part in the symposium organized by Dr. Magruder. The remarks made by Mr. Leighton had especially impressed him. They seemed to him to point more directly and more clearly than had any other single paper to a possible clue to all the different causes at once of the continued prevalence of typhoid fever in the District and its immediate surroundings, in spite of the operation of an otherwise almost perfect water-filtration plant.

Indeed, the singular fact of the installation of the water-filtration plant having practically had no influence whatever on either the morbidity or the mortality records from typhoid fever in the District of Columbia, is so impressive that the thoughtful student of the epidemiology of this disease could hardly fail to be reminded, in this connection, of the now well-known views expressed by von Pettenkoffer and held by him during his whole long and momentous life, namely, that water has nothing whatever to do with the transmission of typhoid fever. And, were it not that the evidence that we possess was so overwhelmingly against such views, as it is, the case under discussion might even today, with some show of success, be used as strong demonstrative evidence in favor of them.

The simple facts suggested to Dr. Beyer by Mr. Leighton's remarks are these: (1) The entire farming country adjacent to the Shenandoah and the Potomac Rivers, now, and for many years past the chief sources of supply of all kinds of dairy products and vegetables to the District of Columbia, was once, over forty years ago, the scene of a widespread, severe and prolonged typhoid fever epidemic, a time when the typhoid fever germ was not yet discovered. (2) The geological formation of the soil of that region of the country, its hydrographic and geodetic features, together with its climatic conditions, present the most favorable environmental conditions for the continued prosperity of the typhoid fever bacillus, since then discovered, outside of its more normal human host, and that, consequently, it may be easily understood why typhoid fever has continued to occur regularly, ever since that time, in the native population, and in a form so mild that the overwhelming number of cases, especially among the children, has passed unnoticed, and adults have acquired a partial immunity against the disease. (3) The other facts may be deduced from the preceding two, namely, that the native population of these farming districts, more especially concerned in this inquiry, without being aware of the fact, now constitutes the chief culture medium of the bacillus Eberth and is furnishing a steady and continued supply of it, first in order, to its own local wells and, next, to other adjacent surface-water supply sources. Both drinking and utility water being in this manner perpetually contaminated, the explanation for a further steady and continued contamination of the vegetables raised on these farms, and of the dairy products produced on them, would seem to become easy and almost unavoidable.

Briefly summarized, the present conditions of the situation are as follows: The central or home production of the typhoid fever bacillus continues unabated and nothing is being done to stop it; of the channels open to its peripheral distribution, only one has, so far at least, been successfully stopped up, that of the city water supply, while the remaining channels through which our dairy products and vegetables reach us, and the "direct-contact channels," have remained open and continue operative up to the present day.

In view of these conditions it would seem that a new campaign against the disease must be organized and new methods must be devised to overcome the difficulties that have proved too great for the old methods.

A house-to-house search for mild cases of typhoid fever, especially among children, in the farming and other districts, and for chronic bacillus-carriers among both adults and children, would, therefore, it seemed to him, to be clearly suggested as the next logical step to take in this present study and investigation of the typhoid fever question, its causes and prevention, by the

organized scientific men in the District. The number of reported bacillus carriers is increasing daily. The last reported case harbored the bacillus in the feces for eighteen years. (Friedel. zur Kasuistik der Typhusträger, Arch. f. Schiff-Tropen-Hygiene, 1908. Bd. XII. Hft. 3 p. 108.) For, our city water supply having been effectually eliminated as a cause of typhoid fever in the City of Washington, and milk and butter, as well as vegetables, constituting merely the vehicles for the germ that causes it to persist, we must get nearer to man with our implements of research as the chief supply agent of it. No more direct and convincing proof of this than is furnished by the results of the examination of these dairy products, on the one hand, and of the almost perfect freedom from chemical and bacterial contamination of our city water supply, on the other, is, to his mind, imaginable, with the means at present at our command.

And why should we, he would ask, under the research-light that has been thrown on this entire question by the scientific work done in this District for years, continue to wait, as we have done for years past, until the germs have passed from man into our drinking water, into our milk, cream and butter; why should we continue to depend, in our work against the disease, on quantitative bacterial counts in these different vehicles of the germs, in themselves uncertain and giving us but little information, rather than at once begin to look for them nearer their normal habitat and their normal home, and try to find them in human urine and feces by a direct qualitative bacterial examination, and there destroy them before they can get a chance to contaminate our food products? Have we not had enough of descriptions of dirty farms and of conditions favoring the passage of typhoid fever germs from man into wells and farm products, without getting much further, in order to determine us to "*close in*" on our enemy from now on?

New methods and new problems imply new difficulties. The old ones have been overcome and so will the new ones. If expense is a consideration, is it cheaper, it might be asked, to build large filtration plants and pasteurization plants and keep them in orderly and effectual operation, or to send a few trained bacteriologists into the country for the purpose of examining a few hundred samples of feces and urine, and, having discovered the germs in them, start a system of disinfection of these excrements? If it is absolute safety we are endeavoring to attain, regardless of expense, would not that safety become still more absolute if we would, in addition to filtration and pasteurization plants, join to these the means for a systematic search for the causes of typhoid fever nearer thir original habitat than we have done in the past?

Furthermore, in the pharmacological laboratory of the Johns Hopkins Medical School a piece of work was done last year that

seems likely to have a most important bearing upon our problem. He referred to the work done by Mr. Crowe, under the direction of Dr. Loevenhart, on hexamethylen tetramin, commonly called urotropin. Dr. Beyer was indebted for what information he possessed on the subject to private communications by Prof. Abel and Dr. Loevenhart and to a paper, likewise originating in the Johns Hopkins Hospital, from which, however, he was able only to quote from memory, since, in spite of the most persistent search for several days to find it again, he had failed to do so.

Dr. Loevenhart said: "Dr. Crowe has proven that when hexamethylen tetramin (urotropin) is given by the mouth, it exercises a marked antiseptic action in the bile. He has not proven whether this antiseptic action is due to formaldehyde or to undecomposed urotropin. * * * He has proven, however, that either formaldehyde or urotropin appears in the bile in quantity after administering urotropin by the mouth."

The paper from which Dr. Beyer was obliged to quote merely from memory was one actually describing several operations on the gallbladder from the bile of which typhoid fever bacilli were isolated. These bacilli disappeared from the bile on the administration of urotropin in ten-grain doses several times daily and after several days' treatment. Adding to these facts the further fact that it is in the gallbladder and in the bile that the typhoid bacilli have their most important abiding place in the so-called bacillus carriers, remaining alive and virulent for years, both the indications and the means for sterilizing our bacillus carriers would seem to be given.

**Dr. Magruder,** in closing the discussion, said that it is a source of deep regret that his associates on the committee of 1894 are not alive to hear the terms of appreciation of their work and the earnest endorsements of their conclusions and recommendations, which have so well stood the test of time and experience. It has been truly said that the influence of the work of the members of the Medical Society of the District of Columbia has been widespread.

Congress, during the very next session after the presentation of the report of 1894, enacted a law governing the milk supply along the lines as recommended in this report, namely, to require inspection of the dairy farms and a permit from the Health Officer before one would be allowed to ship milk to the city. This made Washington the first city in the United States that required such a permit.

Dr. Woodward was a member of the committee that framed this law. Shortly after its passage he was made Health Officer. He was the first to institute veterinary inspection of milk cattle and the use of the score card to establish the rating of the milk producers and dealers.

The report, published as Circular 114, Bureau of Animal In-

dustry, Department of Agriculture, of the proceedings of the Milk Commission, convened upon invitation of the District Commissioners, is the most recent proof of the value of the cooperation of the members of this Society in matters of public welfare. A number of the members had the honor of contributing to this report. Mr. Nathan Strauss wrote to Dr. Magruder, that he considered this one of the most valuable documents ever issued upon the dangers of milk as a carrier of disease, and the methods of preventing and diminishing the same. He quoted largely from these proceedings at the Milk Congress held at Brussels last September. Upon his motion, the thirty-one countries there represented adopted the recommendations of this Commission as a proper standard. A late issue of the *London Lancet* referred to this report as a "Federal Text Book upon the Milk Supply," and stated that it would be adopted as the standard for the Health Officers of England. It would be productive of great good, if a copy of this Circular 114 could be placed in the hands of the proprietors of dairy farms and the sellers of milk.

Dr. Rosenau has answered the point made by General Sternberg as to the diminution of typhoid fever after the introduction of improved water supplies and sewers. It must be remembered that these changes were observed in Dantzic, Munich, Berlin and other continental cities of Europe where heated milk was generally used, and in northern cities in this country where cooler temperatures and more stringent regulations as to temperature of milk prevailed.

If we recall the valuable investigations of the Department of Agriculture made during the fall of 1906 and the spring of 1907, we will see that the conditions were markedly improved upon the dairy farms in 1907. During this inspection of the 1,000 farms supplying milk to Washington many defects were found—some the result of carelessness, others of ignorance—few had the facilities for heating water to cleanse the dairy utensils and washing the hands of the milkers; the necessity of taking these precautions was hardly known. The universal practice of these precautions alone would prove of great value. The fearful contamination of the water supplies as shown by the bacteriological investigations was a revelation.

Many of the farmers welcomed the criticisms and proceeded to remedy these defects, as it was found that much could be done at an insignificant outlay of time and money. Much higher scores were given in many cases upon a second inspection.

Since the inauguration of this agitation for a purer milk supply the Department of Agriculture has had repeated enquiries for information and aid.

Mr. Webster, Chief of the Dairy Division, who was prevented from attending this symposium, on account of absence in Michigan in conference with State and municipal authorities upon this

subject, wrote to Dr. Magruder that "The Dairy Division has supplied score cards and given more or less assistance to eight States' departments and Canada and over 100 cities in the United States, 5 milk dealers, 2 colleges (Maryland and New York), 1 secondary school and 1 condensed-milk firm.

"The score card is actually in use by at least 6 State officials; boards of health in 50 cities, 5 milk dealers and 1 experiment station. Cards other than the one prepared by the Dairy Division are in use by the State Dairy and Food Commissioner in Michigan, the State Dairy Bureau of California, the Health Departments of New York and Washington, D. C., the milk commission of New York County, N. Y., by Cornell University, and by a creamery in Vermont and Borden's Condensed Milk Co. in New York."

From the fact that the number of cases of typhoid fever was nearly 200 less in 1907 than in 1906 and that from January 1, to February 27, 1907, there were 84 cases against 50 cases for the same period in 1908, may it not be claimed, that the voluntary effort toward complying with suggested remedial work has already accomplished some results and pointed the way for further improvement? The advice of the Milk Commission for home pasteurization until compulsory pasteurization under official control has been authorized, has been followed in numerous instances.

The heretofore quoted report from the Health Office of Maryland and the known conditions in Cumberland showed that typhoid fever was especially prevalent along the tributaries of the Potomac in 1906. The increase in Cumberland during the fall was very marked. During the same period the number of cases fell off in this city. Dr. Kober has shown that similar conditions in 1889 and 1890 increased the typhoid rate in this city. In the one case, in 1889 and 1890, the Potomac water caused this trouble, in the other, 1906, the Potomac water was rendered harmless by the efficient filtration plant. Without this safeguard, with the contaminated milk, the result might have been much more serious.

The papers and the discussions of this symposium have shown conclusively that, under ordinary conditions, the filtered Potomac water is absolutely safe, both as it emerges from the filter beds and the household taps; the possibility of slight contamination during the times of excessive turbidity; the enormous percentage of contaminated water supplies of dairy farms; the danger of milk pollution by the use of these waters unboiled, as well as the great possibility and probability of polluting the milk supply by the ignorance and carelessness of the typhoid bacilli carriers and the confirmation of the dangers from flies and contact with patients.

These investigations of the dairy farms, including the bacteriological investigation of the water supplies, have confirmed the contention that milk is a most important factor in the causation

of the disease, as advocated by the committee in 1894 and by Dr. Magruder continuously since that date.

Fortunately, whilst pointing out the various contributory causes, the writers and speakers have also pointed out the remedial measures.

## IN MEMORIAM.

### Dr. Benjamin F. Tiefenthaler.*

Whereas, The Medical Society of the District of Columbia has sustained the loss of a worthy member and a congenial associate,

*Therefore, be it resolved:* That the Society express its deepest sympathy with the bereaved family; that these resolutions be spread upon the minutes; that a copy be sent to the widow of the late Dr. Benjamin F. Tiefenthaler.

On February 6, 1908, Doctor Benjamin F. Tiefenthaler passed to "the undiscovered country from whose bourne no traveler returns." He was born in Wooster, Ohio, September 7, 1869, was a registered pharmacist in his native State, and came to Washington, D. C., in April, 1895. He secured the position of Secretary to the late Dr. E. A. de Schweinitz, then Dean of the Faculty, and in that capacity came in close contact with many of the alumni of his alma mater. He received the degree of Doctor of Medicine in 1899 from the Columbian University, and immediately began the practice of his profession. His path was not rose-strewn, but he bravely battled against all obstacles until, in a comparatively short career, he had reached a point where he was meeting with that success which inevitably crowns conscientious efforts to discharge the duties of physician and friend. That he placed family and patients above self probably hastened the end as, well knowing that the avoidance of exposure and overwork were essential to his tenure of life, an all-night vigil at the bedside of one who sought his care precipitated the condition which took him from us. He was a devoted husband and father, a loyal friend and above all, a manly man.

(Signed) Sam'l Fry,
Chas. W. Hyde,
R. M. Little,
*Committee.*

*Resolution adopted by the Medical Society, February 26, 1908.

## REPORT OF THE EDITING COMMITTEE FOR 1907.

WASHINGTON, D. C., *January 1, 1908.*

THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA:

Your Committee on Editing and Publishing the Proceedings of the Society respectfully submits the following report for the year 1907:

Dr. Walter A. Wells resigned from the Committee early in the year.

Dr. Motter has continued to give especial attention to the matter of advertisements.

The usual six numbers of the ANNALS have been printed and distributed, making volume VI, with a total of 562 pages, 100 more pages than in the previous volume.

According to the report of the Treasurer of the Society, who receives the income from advertisements and pays the bills, the cost of printing and distributing the ANNALS for 1907 was $962.44. After deducting $315.42, received from advertisements, and $11.40 from subscriptions, making a total of $326.82 received, there is left a net cost of $635.62. This expenditure includes postage, typewriting, engraving, printing, mailing, stationery and everything else needed in the work. The Society understands that the work of the Committee is gratuitous, and that a faithful effort is made to keep down the expense to the original proposition of an annual cost not exceeding $600.00. It should be stated here that since the publication of the ANNALS was begun, six years ago, the membership of the Society has increased from 285 to 412, nearly 50 per cent. more than in 1902, with a corresponding increase, of course, in the cost of publication. It should also be stated that the reprints that the Society has at times authorized are charged to the ANNALS. This includes the list of members published in May of each year, the original cost of which appears in the bills for the ANNALS.

The Committee has also tried to keep down the expense by insisting, as far as possible, on papers being typewritten and by watching against unnecessary alterations while the work passes through the press.

Requests from time to time have been made upon the Committee from members to publish papers either read before some other society or not read anywhere. In the absence of any form-

al authorization by the Society and because of the expense that would be incurred, the Committee has felt compelled to decline such offers, unless the cost of the printing, etc., was borne by the writer, or, at least, by some one else than by the Society itself. Three papers have so far been accepted for publication and paid for under this arrangement. The charge was at the rate of $1.50 per page, about what is paid by the Society.

The Committee recognizes the fact that with a larger allowance it could broaden the scope of the journal; other features could be added. But with the allowance limited as it is, the Committee feels that it has thus far done about the best that is possible. An assessment of $5.00 a year instead of $4.00, would add about $400.00 yearly to the Treasury of the Society, and by that much enable the Society to broaden out its work.

The Committee congratulates the Society on the fact that the contents of the ANNALS have been considered of sufficient value to the medical profession generally to be abstracted more or less in other journals, and especially by the *Journal of the American Medical Association*. Abstracts of three papers from the November number of the ANNALS appeared in the journal of the Association for January 4, 1908. Authors of papers are also to be congratulated on the fact that their papers appear within a reasonable time after reading, instead of waiting till the close of the year to appear in a volume of Transactions that are scarcely mentioned by the medical journals.

D. S. LAMB,
M. G. MOTTER, } *Committee.*

## PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

**Stated Meeting, January 6, 1908.**—The President, Dr. D. K. Shute, in the chair; many members present.

The Chair appointed Drs. Phillips, Hooe and Jackson as a committee to prepare resolutions on the death of Dr. Almer M. Hoadley.

The Treasurer presented his 34th annual report.

The following officers were elected for 1908: President, Henry D. Fry; Vice Presidents, J. Thomas Kelley, T. A. Claytor; Corresponding Secretary, T. C. Smith; Treasurer, C. W. Franzoni; Recording Secretary, H. C. Macatee; Librarian, E. L.

Morgan; Board of Censors, D. O. Leech, H. B. Deale, J. S. Wall, F. R. Hagner, J. F. Moran.

In the absence of the President elect, Dr. J. T. Kelley, Vice President, presided.

The annual salary of the Treasurer was increased to $200.00.

It was ordered that the annual dues be $4.00.

**Wednesday, January 15.**—The President, Dr. Henry D. Fry, in the chair; about 50 members present.

Dr. Fry was elected to represent the Society as Vice President of the Washington Academy of Sciences.

The annual report of the Committee on Publication was read and accepted.

A letter was read from Rev. G. Calvert Carter, rector of St. Andrew's Church, inviting the members of the Society to hear an address by Rev. Elwood Worcester, D. D., of Boston, on the subject of Psychotherapy, to be delivered at St. Andrews Parish Hall, Tuesday, January 28, at 8.30 P. M. The Corresponding Secretary was directed to give notice of this meeting to the members of the Society and to thank Mr. Carter for the invitation.

The chairman of the committee appointed to report resolutions upon the death of Dr. Hoadley stated that none of his committee was acquainted with Dr. Hoadley. Another committee, Drs. G. M. Ruffin, D. G. Lewis and Savage, was then appointed.

A committee was appointed to arrange for a Smoker at Rauscher's in February; Drs. T. C. Smith, Chairman, A. F. A. King, S. S. Adams, Acker, Mackall and Hagner.

The report of the Committee of Public Health was read by the chairman, Dr. Chappell. Discussed by Dr. Woodward. Further discussion was postponed until January 29. See page 28.

**Wednesday, January 22.**—The President, Dr. Fry, in the chair; about 70 members present.

An appropriation of $260.14 for publishing the ANNALS was granted.

Dr. G. L. Magruder said that the symposium upon the city water supply and the causes of typhoid fever, to be held February 19, would bring out facts of such public importance that the meeting should be open to the public. The Society ordered that the meeting be open to the public.

Dr. S. S. Adams wished to place on record the fact that a specimen of membranous laryngitis from a child dying in the course of typhoid fever, and presented by him at a previous meeting, had been examined at the Army Medical Museum and a false membrane found, involving both larynx and trachea. Some doubt had been expressed at the time as to the existence of false membrane. The report had been transmitted to the Secretary, but was not included in the notes of the case published in the ANNALS.

On motion, the privilege of the floor was extended for ten minutes to Dr. Williams, to make some remarks upon the subject of psychotherapy as he had observed it in Parisian clinics, and with reference to the movement represented by Dr. Elwood Worcester, of Boston. Dr. Williams addressed the Society, and read some letters from prominent American physicians expressing their views upon the Boston movement.

The resignation of Dr. J. L. Dulaney was accepted.

The chair announced the following appointments: To Executive Committee, to serve five years, Drs. S. S. Adams, Wallace Neff, E. W. Reisinger; vice Dr. Sowers, resigned, Dr. D. K. Shute; vice Dr. Kober, resigned, Dr. L. W. Glazebrook. To the Editorial Committee, vice Dr. Wells, resigned, Dr. G. Brown Miller.

Dr. B. M. Randolph read the essay, "Latent and atypical malaria with especial reference to children." Discussed by Drs. A. F. A. King, Lochboehler, S. S. Adams, Williams, Snyder, Mackall, E. L. Morgan, Roy, Muncey, Acker, Wise, Brown and Bishop. See p. 7.

Dr. Vale read, "A brief note concerning subluxation of the humerus." Discussed by Drs. Balloch, D. S. Lamb and Snyder. See p. 5.

**Wednesday, January 29.**—The President, Dr. Fry, in the chair; about 65 members present.

Dr. Hough reported a case of Phlegmonous gastritis, with specimens. Discussed by Drs. Bovée, Blackburn, Lamb and Macatee. See p. 22.

Dr. Hooe reported a case of *Uterus bicornis unicollis*, with specimen; and a case of Iliocolostomy. Discussed by Dr. Hasbrouck.

Dr. Ramsburgh reported a case of Osteitis deformans, with specimen. Discussed by Dr. D. S. Lamb.

The discussion of the report of the Public Health Committee was opened by Dr. Chappell with a summary of the conclusions reached in the report. Remarks were made by Drs. A. F. A. King, Kober, Hickling, Williams and Atkinson. See p. 28.

**Wednesday, February 5.**—The President, Dr. H. D. Fry, in the chair; 32 members present.

An appropriation of $84.00 for engraving was ordered.

Dr. D. S. Lamb reported a case of Pyelonephritis in a solitary kidney, with specimen. Discussed by Drs. Hagner and Roy. See p. 27.

Drs. Claytor and W. W. Wilkinson read a joint paper upon "Tuberculous ulcer of the stomach," with report of a case. Discussed by Drs. Carr, Randolph and Paul Johnson.

**Wednesday, February 12.**—The President, Dr. Fry, in the chair; about 65 members present.

Dr. F. R. Hagner reported two cases of Renal calculus, with specimens. Discussed by Drs. Balloch and G. Brown Miller.

Dr. Dufour read the paper for the evening: "Epidemic influenza; otitis media; complications; treatment." Discussed by Drs. O. M. Muncaster, Butler, Williams, O. Wilkinson, McKimmie, Polkinhorn, Loring, Frank Baker and S. B. Muncaster.

**Public Meeting, Wednesday, February 19.**—The President, Dr. Fry, presided.

The Chair appointed Drs. Samuel Fry, Chas. W. Hyde and R. M. Little a committee to prepare and report resolutions on the death of Dr. Benj. F. Tiefenthaler.

The following program upon the general subject, The Causes of Typhoid Fever in the District of Columbia, was given:

Introductory Remarks, Dr. G. Lloyd Magruder. See p. 38.

The Washington Water Supply, Maj. Spencer Cosby, U. S. A. See p. 37.

The Washington Filters and the Quality of the Effluent Therefrom, Mr. F. F. Longley, Chief Chemist. See p. 44.

The Causes of Typhoid Fever, Dr. M. J. Rosenau, U. S. Public Health and Marine Hospital Service. See p. 57.

Dangers of Domestic Filters, of Water Coolers and of Ice Cream, Dr. H. W. Wiley, Department of Agriculture. See p. 61.

The Water Supply of Dairy Farms, Dr. B. Meade Bolton, Department of Agriculture. See p. 73.

The Early Diagnosis of Typhoid Fever, Dr. L. L. Lumsden, U. S. Public Health and Marine Hospital Service. See p. 81.

New Remedies to Destroy Typhoid Bacilli in the Gall Bladder, Mr. J. H. Kastle, Division of Chemistry, U. S. Public Health and Marine Hospital Service. See p. 85.

Condition of Dairy Stables, Prof. C. B. Lane, Department of Agriculture. See p. 91.

The discussion of the papers was postponed until the meeting of February 26.

**Wednesday, February 26.**—Dr. T. A. Claytor, Vice President, presided; about 70 members present.

Dr. Samuel Fry, for the committee, presented resolutions upon the death of Dr. B. F. Tiefenthaler, which were adopted. See p.

The discussion of The Causes of Typhoid Fever in the District of Columbia, continued from the last meeting, was participated in by Gen. Sternberg, Drs. Kober, Woodward, Schroeder, Mohler, Mr. Leighton, Dr. Rosenau, Mr. Longley, Dr. Beyer, Mr. Kastle and Dr. G. Lloyd Magruder. See p. 119.

# WASHINGTON MEDICAL ANNALS.

Journal of the Medical Society of the District of Columbia.

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EDITORIAL COMMITTEE.

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## Editorial.

### Exchanges.

*Annals Gynecology and Pediatrics.*
*Annals of Surgery.*
*Archives Pediatrics.*
*Buffalo Medical Journal.*
*Colorado Medicine.*
*Cronica Medica Mexicana.*
*Illinois Medical Bulletin.*
*Journal Kansas Medical Society.*
*Journal Medical Society New Jersey.*
*Journal Michigan Medical Society.*
*Louisville Monthly Journal Medicine and Surgery.*
*Maryland Medical Journal.*
*Medical Summary.*
*Modern Medicine.*
*Monthly Cyclopedia Practical Medicine.*
*Northwest Medicine.*
*Pacific Medical Journal.*
*Providence Medical Journal.*
*Texas State Journal Medicine.*
*Therapeutic Gazette.*
*West Virginia Medical Journal.*

### Publications Received.

Transactions Ninth Annual Conference State and Territorial Health Officers with U. S. P. H. M. H. S., May 29, 1907.

*U. S. Naval Medical Bulletin*, January, 1908.

L. F. Barker, "Psychic Treatment of Some Functional Diseases."

Annual Report Surgeon General U. S. P. H. and M. S. S., 1907.

"Milk in its Relation to Public Health," Hygienic Laboratory Bulletin 41, U. S. P. H. and M. H. S.

J. P. Norton, "The Economic Advisability of Inaugurating a National Organization of Health;" June 30, 1906.

W. A. Wells, "Invading the Labyrinth;" reprint, 1907.

G. Savage, "The Duality of Man;" reprint.

W. O. Nance and G. W. Swift, "The Conjunctival Tuberculin Reaction with Diagnosis of Eye Diseases;" reprint.

C. S. Minot, "The problem of Age, Growth and Death;" reprint.

C. S. White, "Cerebral Contusion;" reprint.

Battle Creek Sanitarium System, 1908.

### Photographs of Members.

Up to date, 486 photographs of members have been received; the following since last report:

| | | |
|---|---|---|
| Billard, C. S. | Jenner, N. R. | Scott, J. F. |
| Capehart, B. A. | Lawrence, A. L. | Sprigg, W. M. |
| Deale, H. B. | Lemon, H. T. A. | Sohon, Fred |
| Dooley, F. X. | McCormick, J. H. | Sothoron, Elmer |
| Ewing, F. C. | McGee, A. N. | Tompkins, E. L. |
| Fox, W. H. | Magruder, Hezekiah | Tyler, A. G. |
| Hamilton, J. B. | Magruder, W. B. | Van Arnum, J. W. |
| Heger, Anthony | Mazzei, F. A. | Van Buren, W. H. |
| Hunter, Montgomery | Miller, Thomas | Wagner, W. F. |

## Medical Miscellany.

The Use of Flesh Food.—*Modern Medicine*, quoting from Martinet, "Les Aliments Usuels," Paris, 1907, p. 126, gives the following contraindications to the use of flesh food:

(1) A meat diet favors intestinal putrefaction, encouraging constipation; it is, therefore, absolutely contraindicated in acute and chronic gastrointestinal infections, particularly in the case of enteritis.

(2) Flesh foods provoke the superabundant formation of nitro-

genous wastes, of purins in particular; hence they are to be avoided in the various forms of purinemia (gout, lithiasis, chronic rheumatism of uricemic origin, plethora, etc.). Foods rich in nucleins should be proscribed (sweetbread, liver, kidney, etc.).

(3) Flesh foods elevate arterial tension and overwork the heart; contraindicated, therefore, in cases of hypertension, in arteriosclerosis, atheroma, aortic aneurisms, myocarditis, cardiac affections with broken compensation, or hyposystole where the least elevation of pressure may invite a failure of compensation.

(4) Flesh foods increase the quantity of hepatic toxins, of the urinary excreta, and cause congestion of the liver and kidneys. On this account they are contraindicated in hepatic and renal congestions, the cirrhoses, inflammation of the liver, acute and chronic parenchymatous or interstitial nephritis.

(5) Flesh foods act undoubtedly as excitants of the nervous system, in the same manner as tea, coffee, etc., on account of the extractive substances contained. On this account they are contraindicated in cases of neurasthenia, arterial hypertension, insomnia, obstinate neuralgia—in short, in every case of abnormal excitation of the nervous system, whether accompanied by pain or not.

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Sterilization of Criminals.—In Indiana the sterilization of criminals has been legalized. It is stated that hundreds of criminals have been sterilized at their own request. The process is by vasectomy or vasotomy.

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The Rockefeller Institute for Medical Research, New York City, purposes to award for the year 1908–1909 a limited number of scholarships and fellowships for work to be carried on in the laboratories of the Institute in New York City, under the following conditions:

The scholarships and fellowships will be granted to assist investigations in experimental pathology, bacteriology, medical zoölogy, physiology and pharmacology, physiological and pathological chemistry and experimental surgery.

They are open to men and women who are properly qualified

to undertake research work in any of the above mentioned subjects and are granted for one year.

The value of these scholarships and fellowships ranges from Eight Hundred to Twelve Hundred Dollars each.

It is expected that holders of the scholarships and fellowships will devote their entire time to research.

Applications accompanied by proper credentials should be in the hands of the Secretary of the Rockefeller Institute not later than April 1, 1908. The announcement of the appointments is made about May 15. The term of service begins preferably October 1, but by special arrangement may be begun at another time.

Address L. Emmett Holt, M. D., Secretary, 14 West 55th Street, New York City.

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The Hodgkins Fund Prize of $1,500 is offered by the Smithsonian Institution, Washington, D. C., in accordance with the following announcement: In October, 1891, Thomas George Hodgkins, Esquire, of Setauket, New York, made a donation to the Smithsonian Institution, the income from a part of which was to be devoted to "the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man."

In the furtherance of the donor's wishes, the Smithsonian Institution has from time to time offered prizes, awarded medals, made grants for investigations and issued publications.

In connection with the approaching International Congress on Tuberculosis, which will be held in Washington, September 21 to October 12, 1908, a prize of $1,500 is offered for the best treatise that may be submitted to that congress "On the Relation of Atmospheric Air to Tuberculosis."

The treatises may be written in English, French, German, Spanish or Italian. They will be examined and the prize awarded by a committee appointed by the Secretary of the Smithsonian Institution in conjunction with the officers of the International Congress on Tuberculosis.

The right is reserved to award no prize if in the judgment of the committee no contribution is offered of sufficient merit to warrant such action.

The Smithsonian Institution reserves the right to publish the treatise to which the prize is awarded.

Further information, if desired by persons intending to become competitors, will be furnished on application. Address, CHARLES D. WALCOTT, Secretary, Smithsonian Institution.

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THE MEDICAL SCHOOLS OF THE DISTRICT OF COLUMBIA.—The *Journal of the American Medical Association* published February 22, 1908, contains the results for part of 1907 of the examination for registration of physicians in this District. The results for the local schools are as follows; all averages below 75 are failures:

Georgetown University: 88.6, 87.1, 84.8, 81.2, 80.5, 79.7, 79.2, 78.4, 77.4, 73.9, 73, 72.1, 72, 71.2, 70.2, 69.7, 61.1.

George Washington University: 89.9, 87.6, 87.3, 87.2, 86.7, 85.1, 84.8, 84.6, 83.7, 83.7, 81.8, 81.6, 80.9, 80.8, 80.7, 80.3, 79.8, 79, 78.2, 77.5, 77.4, 77.3, 76.4, 76.3, 76.1, 75.5, 75, 72.7, 72.6, 72.3, 72.3, 70.4, 68.3, 67.1, 47.8.

Howard University: 90.2, 84.5, 84, 79.1, 75.4, 75.3, 73.2, 72.5, 71.9, 68.5, 67.5, 63.7, 50.6.

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# WASHINGTON MEDICAL ANNALS

## ACID INTOXICATION.*

By JOHN BENJAMIN NICHOLS, M. D.,

Washington, D. C.

There is a morbid condition, not very infrequently encountered, which is definite in its clinical manifestations, but our present knowledge of the essential nature and causation of which is quite obscure, to which the designation *acidosis* or *acid intoxication* is usually applied. This designation is used in this paper, for want of any other or better term, with the reservation that future investigations may possibly show that (like the terms uremia and lithemia) it may be a misnomer, and convey an erroneous idea as to the real character of the disorder.

By the term acidosis is meant a derangement of metabolism characterized by an excess of acids in the systemic processes. Acid intoxication may be taken to mean a condition of acidosis with associated toxic phenomena.

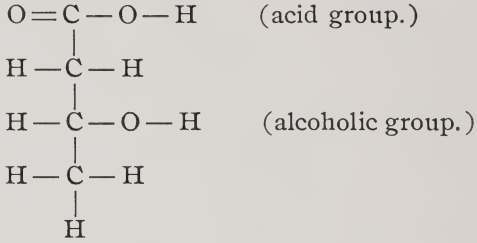
There are a number of known ways by which a preponderance of acids may actually or conceivably be brought about: (1) by excessive ingestion of mineral acids; (2) by exclusion of bases from the food; (3) by absorption of fatty, lactic or other acids generated by the breakdown or fermentation of fats, proteids or carbohydrates in the alimentary canal; (4) from sulphuric, phosphoric, lactic, oxalic, uric, glycuronic and other similar intermediary acids produced in the course of metabolism; and (5) that form associated with the appearance of acetone, diacetic acid and betaoxybutyric acid.

The last named is much the most frequent form; in most cases of acidosis clinically met with the acetone bodies are present, and

* Read before the Medical Society, March 4, 1908.

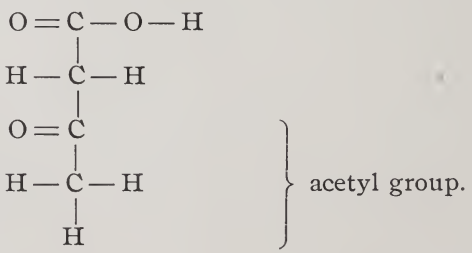
their connection with the disorder is a very distinctive and important feature.

Betaoxybutyric acid is the fourth of the lactic or oxy-fatty acid series, and has the graphic formula



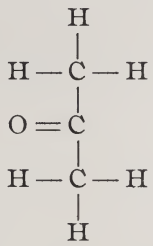

It is a weak monobasic acid, syrupy, non-volatile, levo-rotatory. It differs from butyric acid, $COOH.CH_2.CH_2.CH_3$ (the fourth of the fatty-acid series), by the substitution of hydroxyl for one of the hydrogen atoms in the beta position; the direct preparation, *in vitro*, of betaoxybutyric from butyric acid has not, however, been accomplished. By oxidation (loss of the two hydrogen atoms of the alcoholic radicle), betaoxybutyric acid is generally supposed to be convertible into diacetic acid,—$C_4H_8O_3 + O = C_4H_6O_3 + H_2O$. Lactic acid, $COOH.CHOH.CH_3$, is closely related chemically to betaoxybutyric acid, being the next lower acid in the same series; and it is significant that lactic acid is a conspicuous intermediary substance in metabolism, and by some investigators has been regarded as prominently concerned in the production of some forms of acidosis.

Diacetic or aceto-acetic acid is a weak monobasic acid of the formula




It is very unstable and (with its salts) is readily decomposed, as by boiling, into acetone and carbon dioxide (or carbonates), thus—$C_4H_6O_3 = C_3H_6O + CO_2$.

Acetone (dimethyl-ketone, methyl-acetyl) has the formula




(kėtone radicle.)

It is a stable, colorless, volatile fluid of a characteristic fragrant odor.

Betaoxybutyric acid is generally regarded as the antecedent of the other two acetone bodies, it breaking down into diacetic acid and the latter in turn into the more stable acetone. Unless present in large amounts these bodies are, therefore, excreted as acetone; but in marked cases of acidosis diacetic acid appears in the urine as well as acetone, while in extreme cases betaoxybutyric acid also appears. The two acids are excreted only by the kidneys; acetone is excreted in the breath as well as the urine, and may appear also in the perspiration, saliva, vomitus, feces, blood and organs. Acetone is normally excreted in the urine in minute amounts, 10 to 20 milligrams daily, and in the breath in about double this amount; but in acidosis it, often with its precursors, appears in the excretions in greatly increased quantity, so as to become perceptible by ordinary tests or by the sense of smell. The excretion of acetone in extreme cases may reach 10 to 15 or even 19 grams daily, while betaoxybutyric acid may (especially in diabetes) be excreted in enormous amounts, 100 to 200 or even 225 grams per day.

The exact manner in which the acetone bodies are formed in the system has not yet been cleared up. Acetone was originally regarded as a product of the fermentation of carbohydrates in the alimentary canal, but this view, for convincing reasons, has been abandoned, and it is not now believed to be of carbohydrate origin. It is possible for acetone to originate from proteid, as a product of putrefaction, or in connection with the katabolic breaking down of the acid components or fatty-acid derivatives of the proteid molecule; but this is not regarded as an important source of the acetone bodies.

The chief source of these bodies is now generally considered to be the breakdown of fat, either the fat of the food or that of the body tissues, especially, perhaps, the latter. Of the two components of fat, glycerin and fatty acids, it is the fatty acids that produce betaoxybutyric acid and the other acetone bodies. In its normal oxidation fat is finally completely broken down into water and carbon dioxide, and in this process the fatty acids probably go through a series of intermediate stages to the final products. Betaoxybutyric and diacetic acids are apparently formed, either normally or abnormally, as such intermediate bodies in the course of the oxidation of fat; but why oxidation should be arrested at that point in acidosis, instead of being completed, is unknown.

The place of acetone formation appears to be the internal tissues and organs of the body, perhaps largely the liver. The alimentary tract, for various reasons, seems not to be the site of acetone production; it is generated there, if at all, very rarely and very scantily, and its occasional presence in the vomitus and feces is probably best explained as an excretion from the blood. It is possible or conceivable, however, that the intestine may be the seat of production, by fermentation, of an excess of lactic or fatty acids the absorption of which into the blood might produce a non-acetonic acidosis.

An important result of the excess of the acids concerned in acidosis is that they enter into combination with a corresponding amount of the alkalies or bases of the body and prevent the latter from their ordinary participation in the body processes. The acids do not circulate in their free state, but as salts of these bases, and are excreted as such. In this manner there occurs an excessive waste of the bases through their excretion by the kidneys, the body store of them suffers loss, and the functions depending on them are impaired (for instance, their respiratory carbon-dioxide-carrying function).

An essential manifestation of all forms of acidosis (with or without the acetone complex) is therefore an increase in the amount of the bases excreted in the urine. In addition to the fixed bases, sodium, potassium, calcium and magnesium, the store of which in the body is limited, the acids have an ample amount of ammonia available with which to combine, namely, that which would otherwise enter into the formation of urea.

Urea may be regarded as a dehydrated union of ammonia and carbon dioxide, thus, $(NH_3)_2 + CO_2 = CON_2H_4 + H_2O$. In acidosis the excessive acids present seize upon the ammonia needed and prevent the latter from forming urea ; and thus the ratio of ammonia to urea in the urine (or, as it is usually expressed, the proportion of the ammonia nitrogen to the total nitrogen) is materially and conspicuously greater in acidosis than in the normal state.

In this connection may be mentioned a suggestion that has been made that reverses the usual explanation of the origin of the acetone bodies and the high ammonia ratio, namely : that a disturbance of the urea-forming processes might develop, as in hepatic disorder, in which the katabolic ammonia might be only partially utilized in forming urea, and the unused portion by combining with the intermediary fatty acids might fix them and prevent their complete oxidation.

There are certain factors well known and experimentally demonstrable which govern the incidence or the subsidence of acetonuria and acidosis.

An excess in the amount of fat ingested is capable of causing an increase in the quantity of acetone excreted. The body normally, however, is able to metabolize an ample amount of fatty food without disturbance.

The most distinct and striking factor bearing on the excretion of acetone is the influence of the concomitant carbohydrate metabolism—determined either by the amount of carbohydrate food or by an impairment of carbohydrate oxidation such as occurs in diabetes. A deficiency of carbohydrate food or oxidation greatly increases the excretion of acetone, while the ingestion of carbohydrate in cases of experimentally-established acetonuria causes a prompt and marked subsidence of the amount excreted. This latter effect of carbohydrate is very slight or *nil* when it is given by rectum or subcutaneously, but is developed in the most marked manner (within two or three hours) when given by mouth. So conspicuous is the effect of deficient carbohydrate metabolism on acetone excretion that some authorities are inclined to assign it as the sole determining cause for the incidence of acidosis in all the numerous conditions in which it occurs. It appears probable to me, however, that acidosis may occur in cases in which the carbohydrate metabolism is normal. The way by

which a disturbance of carbohydrate metabolism can effect this derangement of fat metabolism is quite obscure. Two theories of possible action are advanced: one, that the carbohydrate in some unknown specific way promotes complete oxidation of the fats or acetone bodies; the other, that it acts by sparing the body fat from being destroyed.

Starvation, or the withholding of all food, produces an immediate and very great increase in the excretion of acetone. Some claim that the carbohydrate deficiency in total starvation is alone sufficient to account for the increased acetonuria; while others hold that starvation *per se* produces acidosis, aside from and in addition to the carbohydrate withdrawal (as by destruction of the body fat).

Glycerine acts like other carbohydrates in lessening acetone excretion; hence neutral fats should show a less tendency to yield acetone than the fatty acids.

The administration of a diet from which the bases are removed has been shown experimentally to be capable in the course of several days of producing conditions of acid intoxication. This would seem to be simply a relative acidosis, arousing the effects of "alkalopenia" without any actual increase of acid, and hence of a type distinct from the acetone acidosis. As a matter of fact, however, acetonuria may develop in such experimental cases.

In the cases of acid intoxication that have come to autopsy marked fatty changes in the liver have been uniformly found, often of an extreme degree, so that they have been frequently designated as cases of acute yellow atrophy. Fatty changes of other organs, as the kidneys and muscles, have also been noted. Brackett, Stone and Low in their series had an unusual number of cases in paralysed children, which they connect with visceral fatty changes in such subjects. It is evident that there is a fundamental relationship between acid intoxication and fatty changes in the liver and other viscera. Some authorities hold that hepatic degeneration and insufficiency is the essential cause of acid intoxication, and are inclined to differentiate two distinct conditions: one of acetonuria or acidosis, an expression of deranged metabolism; and another of acid intoxication, much more serious, a hepatogenous toxemia. Before this view can be finally adopted there are some objections to be met. The manifestations of the metabolic and the hepatic forms of acidosis seem too

inextricably interwoven for a clear differentiation to be possible in the light of present knowledge. Some cases of acidosis, as those developing after trauma or shock, occur under conditions in which there would seem to have been no way or sufficient time for hepatic degeneration to have been accomplished. It may be that the abnormal deposits of fat in the liver are concerned in the production of acidosis more through affording a supply of body fat capable of undergoing abnormal katabolization rather than through effecting hepatic insufficiency. It has also been suggested that fatty liver may be an effect of acidosis rather than its cause.

From a consideration of the great diversity of conditions in which acidosis occurs, it seems to me that there are some cases in the production of which neither metabolic derangement nor hepatic insufficiency is involved; and I am inclined to believe that a nervous factor may be concerned in the causation of some cases. Nervous, high-strung children have been said to be especially liable to postoperative acidosis, while homesickness and fright have been included among the contributing causes. A sudden shock to the system, as after injuries, may set up an attack, so that a nervous form of acidosis seems possible. Just as nerve centers have been found the irritation of which produces such disturbances of metabolism as fever and glycosuria, so it is not unreasonable to speculate that there may be similar centers influencing fat metabolism.

The agents actually producing the toxic phenomena in cases of acid intoxication are not known. Several hypotheses are open:

(1) That the acetone bodies are themselves the toxic agents. The compounds of betaoxybutyric and diacetic acids have, however, been experimentally found to possess but slight toxic properties, while acetone is quite innocuous. The toxicity of these substances seems entirely inadequate to account for the phenomena of acid intoxication.

(2) That these acids exert their deleterious action by virtue of their acidity, or conversely,

(3) That the harmful effects are due to the withdrawal or diminution of the bases of the body; this leading to abnormalities of proteid metabolism and disintegration, disturbances of respiratory processes, or other unknown conditions underlying the morbid manifestations.

(4) That the real toxic agents are some unknown precursors or associates of the acetone bodies, the latter being inert and incidental, though useful indexes of the disorder; or that the acidosis is a minor and secondary condition, the toxemia being of different character and the primary cause of the serious symptoms.

It will be seen from the foregoing considerations that while some factors stand out clear and distinct in the etiology and pathology of acid intoxication, on many points the underlying processes are enveloped in obscurity.

The *clinical manifestations* of acid intoxication usually form a clear and distinct symptom-complex that should in most instances be unmistakable.

The main phenomena of the disorder are: increased ratio of ammonia excretion; increased excretion of acetone and its precursors in the urine and breath; vomiting; dyspnea; nervous symptoms—restlessness, convulsions, delirium, mental disorder, apathy, drowsiness, stupor, coma; weakness, prostration, collapse.

An essential feature of all cases of acidosis—of the infrequent non-acetonic cases as well as the ordinary cases exhibiting acetone—is the increase of the ratio of ammonia nitrogen to the total nitrogen of the urine, from the normal 4 or 5 per cent. to from 10 to 50 per cent. On account of the time and labor required, determinations of ammonia and nitrogen are not ordinarily practicable.

In the ordinary forms of acidosis acetone is present in the urine in amount sufficient to be readily demonstrated. Since a trace of acetone normally occurs in the urine, it is only a pathologic increase that is of significance in the diagnosis of acidosis—an amount, for instance, sufficient to yield a reaction with easily applied tests like that of Lange. If present in the urine in sufficient amount, its characteristic fragrant odor will be perceptible; but absence of the odor can not be relied on as evidence of the absence of acetone. Accompanying the acetone, especially if it is in large amount, the urine may contain diacetic acid; and if in still larger amount betaoxybutyric acid also.

In severe cases the urine may be diminished in amount, and often contains albumin, casts and blood; temporary glycosuria sometimes occurs. These urinary conditions may lead to erroneous diagnosis of uremia or like disorders. Acidosis does not

necessarily have any effect on the reaction of the urine, as the peccant acids are excreted in combination with bases as neutral salts; and the notion sometimes entertained that urinary hyperacidity is a characteristic of the condition is probably erroneous.

An excess of acetone is often excreted by the breath, distinctly imparting to the latter its characteristic odor. The odor of the breath is usually an early and marked symptom, and one which frequently first directs attention to the true nature of the case.

In the majority of cases of acidosis the only manifestation of the disorder is acetonuria. Such cases are unrecognized unless acetone happens to be tested for. Mere acetonuria without systemic or toxic manifestations is of very common occurrence, and is not necessarily a matter of much consequence; but when toxic effects are superadded acidosis becomes of import and may assume the gravest character. There appears to be no obvious relation between the amount of acetone in the urine and the intensity of the toxic symptoms; acetone may appear in large amount and other symptoms be entirely absent, while there may be marked intoxication with only small or moderate excretion of acetone. This, perhaps, affords some ground for the belief and distinction that mere acetonuria is one thing ("acidosis"), while the superadded systemic toxic manifestations ("acid intoxication") are quite another thing, involving etiologic and pathologic factors different from and supplementary to those of simple acetonuria. All gradations occur, however, in the intensity of the cases.

Vomiting is one of the main symptoms in marked cases of acid intoxication, although it may not occur invariably. It constitutes the main feature of some cases, as in the recurrent vomiting of children and pernicious vomiting of pregnancy. It is apt to appear early, and while sometimes slight or moderate, it is usually severe and may become of the most extreme and grave character. In such cases the vomiting is obstinate, frequent, uncontrollable and protracted, excited by the least irritation, as by every attempt to swallow food or liquids. When long kept up the inability to take nourishment causes starvation, emaciation and great asthenia. Thirst sometimes occurs, from inability to retain liquids. The vomitus may be bile-stained and dark, and may yield the odor of acetone; blood is occasionally but not usually present. The bowels are not especially affected. Icterus sometimes occurs.

Dyspnea is a marked feature of many of the severe cases. It may be of marked intensity, and in some fatal cases deepens into cyanosis. Asthmatic conditions are sometimes present.

The body temperature may be normal or slightly elevated or considerably increased; occasionally in terminal stages it is extraordinarily high (terminal fever of 110 degrees having been observed). The heart action in severe cases is accelerated and weak. Little is said in the literature concerning blood changes. In one fatal case of pernicious vomiting from retained dead fetus, with hyperthermia and without infection, I found a leucocytosis of 30,000, of which 95 per cent. were polymorphonuclears; in two moderate, idiopathic non-septic cases the leucocytes were normal.

Nervous symptoms are very conspicuous in acid intoxication and in many cases dominate the clinical picture. Restlessness, delirium and mental wandering appear in some cases; apathy, drowsiness and stupor, which may deepen into coma, characterize others. In some cases periods of restlessness and delirium alternate with periods of apathy and stupor. Convulsions sometimes occur.

Weakness and prostration occur in moderate and severe cases, which may increase to fatal collapse.

While the cases of acidosis are quite characteristic and usually easily recognizable, there are many variations in the particular combinations of symptoms present. In severity, the cases range from slight acetonuria, through cases presenting mild toxic symptoms, to cases of overwhelming toxemia in which death quickly results. The great majority of the cases, those manifested mainly by acetonuria, are trivial and inconsequential, but a considerable proportion of cases exhibit material toxemia, and the marked cases are much commoner than is generally realized.

Acidosis is ordinarily an acute process, protracted cases not occurring except where, as in diabetes, the conditions are such as to keep up the derangement of fat metabolism indefinitely. The onset may be quite abrupt. In the mild and non-fatal cases the attacks last from two or three days to two or three weeks. In fatal cases the outbreak may run its entire course within twenty-four hours, or it may continue for a few days or even a couple of weeks. Death usually results from the toxemia; sometimes from starvation conditions caused by inability to retain food in the stomach.

All ages are subject to it, but the susceptibility is much the greatest during childhood (perhaps from the more fatty livers of that period of life ?). Some subjects, especially children, appear to have a special susceptibility and suffer repeated attacks of acidosis.

Some forms or cases of acidosis are fairly idiopathic or cryptogenetic. Most cases, however, develop secondarily to some distinct condition that acts as a determining cause for it, although even when a secondary complication the manifestations of acid intoxication may overshadow in prominence and gravity those of the disorder producing it.

The chief conditions with which acidosis is associated are: diabetes mellitus, starvation, carcinoma, nervous diseases, gastric disorders, recurrent vomiting of children, pregnancy (pernicious vomiting, retention of dead fetus), puerperium, excessive use of fat food, toxic conditions, anesthesia, fevers and infections, injuries.

The incidence of acid intoxication in the course of diabetes mellitus, in the form of the so-called diabetic coma, is well known and requires no further consideration here. This form of acidosis is clearly due to the impaired carbohydrate metabolism, along with lowered carbohydrate feeding.

Since fasting experimentally produces acidosis, morbid conditions in which food cannot be taken or retained may be complicated by acidosis; this is an important factor bringing on the complication in numerous diverse cases.

In carcinoma, especially the late stages, acidosis sometimes occurs.

Acidosis is markedly associated with nervous and mental disorders, especially during the active or paroxysmal periods. Thus, Hoppe, among 325 epileptics, found acetonuria present in 8.5 per cent. of the cases, especially during the paroxysms. In 55 cases of acute psychoses he found acetonuria in 34 per cent., especially during the periods of depression or excitement. Among 38 idiots and 8 chorea cases acetonuria was not found. In 75 paralytics acetonuria occurred quite regularly at times of "paralytic attacks," convulsions, pareses, paresthesias, etc. Hoppe states that the occurrence of acetonuria in all these cases was associated with marked clinical phenomena, and he found the cases in well-nourished as well as ill-nourished patients. Some nervous and mental attacks may therefore be manifestations of acid intoxication.

A certain proportion of cases of gastric disorder are associated with acidosis. The association may be twofold: the gastric symptoms may be the expression of a primary acid intoxication; or, on the other hand, the inability to retain food in a primary gastric disorder may set up a secondary acid intoxication as a further complication. In either case, whether the acidosis is primary or secondary, the nervous and other symptoms of this disorder may be present in addition to the vomiting, thus making the case appear irregular and puzzling to the practitioner unless acetone is looked for and found.

The recurrent vomiting of children, there is good reason to believe, is a pure manifestation of acid intoxication, primary and idiopathic. Acetonuria has been found at the very beginning of the attacks, and the outbreaks may develop abruptly without any of the ordinary provocative causes being apparent.

According to Shaw and Tribe, who have made an analysis of 55 cases, recurrent vomiting has begun as early as two months of age, but may not appear under three years, and may continue to recur until puberty, after which it tends to disappear. The attacks may last from twelve hours to several weeks, usually three to fourteen days, and averaging five or six days. The attacks recur at intervals of three weeks to a year, frequently about every three months. Along with the persistent vomiting may appear other characteristic symptoms of acid intoxication, as odorous breath, dyspnea, restlessness, drowsiness, etc. From prolonged inability to take food marked inanition and emaciation often result. Thirst at times occurs. Three of the 55 cases proved fatal, death resulting from inanition or toxemia.

Acidosis may occur in pregnancy, and seems to be the cause (or at least the accompaniment) of some of the cases of pernicious vomiting of pregnancy. The retention of a dead fetus is particularly apt to lead to a severe acid intoxication. Williams follows the ammonia-nitrogen ratio as the index to the gravity of the case, and recommends emptying of the uterus when this ratio exceeds 10 per cent. Fatty degeneration of the liver, produced by the toxins of pregnancy, is regarded as the source of acid intoxication in these cases.

Acidosis may occur also in the puerperium.

Excess of fat in the food.—In some of the published cases of vomiting and acidosis in children, feeding with milk too rich in

fat has been regarded as among the probable incitants of the disorder. Edsall has pointed out that cases presenting symptoms of nutritional disturbance, foul breath, vomiting, etc., may occur in both children and adults from the continued use of an excessive amount of fat in the diet, apparently from the incitement of a condition of acid intoxication. Ingestion of excessive quantities of fat, or probably even of moderate amounts with persons having an idiosyncrasy against it, is therefore, as indeed would appear probable from a consideration of the chemical factors involved, to be included among the causes of acidosis.

Acidosis may be brought about in association with the action of a considerable number of toxic agents, such as phosphorus, lead, atropia, carbon monoxide, alcohol, morphinism, etc., in some at least, of these cases, probably from the hepatic changes induced.

One of the most important forms of acidosis is that occurring after anesthesia, which is probably to be classed with the toxic group of cases, although a nervous element may, possibly, also be involved. The cases may occur after chloroform, ether or nitrous oxide, after slight as well as severe operations, and show all gradations from mere acetonuria to overwhelming and fatal toxemia. Considerable attention has been recently directed to this class of cases, especially under the rubric of delayed poisonous effects of anesthetics. In the fatal cases the symptoms set in usually in from about ten to forty-eight hours after anesthesia, sometimes after a longer interval, death occurring in from one to three or more days after onset. The ordinary post-anesthetic vomiting becomes much aggravated, and the development of acetonuria, restlessness, dyspnea, icterus, coma, etc., completes the picture of acid intoxication. Marked fatty changes in the liver have been found at autopsy in these cases; and as chloroform has been experimentally shown to be capable of producing such changes within a brief time, it is becoming generally regarded that the hepatic insufficiency thus produced gives rise to the acid intoxication.

In febrile and infectious conditions acetonuria is very common. Thus, Meyer found acetonuria in 26 out of 37 cases of diphtheria, in 18 out of 26 cases of scarlatina, and in 9 out of 15 cases of measles. In 12 consecutive cases of typhoid fever (a single test only in each) I found acetonuria in 4. In septic con-

ditions like appendicitis it is also common. While in the vast majority of such cases the acidosis is trivial, yet distinct toxic symptoms sometimes develop; thus, I have known of a case of diphtheria and one of mastoiditis initiated with convulsions and coma, respectively, from this cause.

Severe injuries, such as wounds, contusions, fractures, cerebral concussion, etc., may be followed by acidosis, sometimes with marked toxic effects as well as acetonuria.

*Treatment.*—From a consideration of the conditions influencing acid intoxication it is obvious that in its treatment three important therapeutic measures are available: carbohydrate feeding, restriction of fatty food, and administration of alkalies.

On account of the potent influence of an adequate carbohydrate metabolism in lessening acidosis, a most important indication in treatment is to feed the patient a generous amount of carbohydrate material. Diabetics should have carbohydrates restored to their dietary when the symptoms point to approaching acidosis; and in all other patients with acid intoxication carbohydrate feeding should be immediately instituted or attempted. The kind of carbohydrate is probably immaterial, whether starchy or any of the sugars; the amount should be ample, 150 grams or more daily.

On account of the obstinate vomiting it is in some cases very difficult or impossible to give carbohydrate food by the mouth. This avenue of administration, however, is the only way by which the full effect of the carbohydrate is exerted; it has been found experimentally that rectal or subcutaneous administration has very little or no effect on acidosis. Every effort should be made, therefore, to give the carbohydrate by mouth; and it is only when this is impossible that rectal, subcutaneous, or even intravenous injection of dextrose or other suitable sugar may be tried for whatever benefit may be so obtainable.

In most cases the fat in the food need not be restricted beyond moderate limits, as the capacity of the organism for metabolizing fat is normally ample. In those cases, however, where an excess of fat is being taken or is producing symptoms, and with persons who have an idiosyncrasy against moderate or small amounts of fat, the diet should be corrected accordingly.

On the theory that the toxic manifestations in acidosis are due largely or partly to the abstraction of bases from the body, the

free administration of alkalies to replace those lost has acquired considerable vogue. In some cases this mode of treatment produces good results, but in others it affords no benefit; it should be tried, nevertheless, in all severe cases. Sodium bicarbonate is most employed for this purpose, in the amount of 15 or more grams daily; in addition to this is also recommended calcium carbonate (3 grams daily) and sodium citrate (5 grams). In case of inability to give the alkali by mouth, it may be tried by rectum, subcutaneously, and even intravenously. The urine should become alkaline under this treatment.

It has been the purpose of this paper not only to present an outline of existing knowledge concerning acid intoxication, but also to call attention to the fact that the condition, even in marked and serious form, occurs much more frequently than is generally realized. I suspect that in many cases with obscure features that puzzle the clinician, cases regarded as peculiar forms of indigestion, shock, uremia, convulsions, cerebral concussion, etc., an element of acidosis is involved. Owing to the variety of conditions in which it is apt to develop, it is of importance in all domains of medicine, to the internist, the surgeon, the obstetrician and the pediatrist; and clarity of diagnosis and greater efficiency in treatment will be obtained by its recognition, which should usually present little difficulty.

**Dr. Williams** asked upon what grounds Dr. Nichols rejects Von Noorden's theory that acidosis is based upon errors of proteid metabolism, holding the conception of the proteid origin of acetone rather than a fatty origin. Von Noorden found that heavy fat feeding did not increase acetone, while both starvation and proteid feeding did increase it. Dr. Williams also called attention to the influence of fats in retarding absorption of carbohydrates in the intestines by preventing the ready access of the digestive fluids to the carbohydrate food material.

**Dr. Kober** said that as long as the etiology of the condition appears to be obscure he might venture the suggestion that the origin of acidosis is in some untoward bacterial activity in the intestinal canal. Personally he believes that these morbid substances arise from intestinal fermentative changes of bacterial origin. The intestinal flora may change in character and products with changes in environment and in food ingestion; in other words, the habitat being changed in effect and the culture medium being changed in fact, the bacterial products may become the deleterious substances which give rise to the symptoms of acid intoxication.

**Dr. Mackall** mentioned the case of a young lady, 20 years of age, active, healthy and handsome, who met with an accident and was immediately plunged into a heavy, lethargic state; religious mania appeared; there was acetone in the urine. Under treatment with alkalies she recovered, though she subsequently had a second similar attack in Baltimore. This patient came of a diabetic family. He suggested the possibility that some ductless gland might be at fault in acidosis. He had recently been treating the vomiting of pregnancy with large doses of bicarbonate of soda with considerable success. He congratulated Dr. Nichols upon his paper.

**Dr. J. D. Thomas** had never been convinced as to the accuracy of any theory of the etiology of acidosis from the chemical standpoint; but he was much interested in the clinical aspect of the question. The bearing of asthma upon the etiology was of interest; Dr. Nichols had spoken of the possibility of an asthmatic attack being induced by acid intoxication; Dr. Thomas had seen two cases of asthma in which acidosis appeared late in the attack, overshadowed all other symptoms, and in both instances was cured by alkalies. One of these patients, a boy, had later a second attack of acid intoxication during the course of pneumonia. Acidosis appears to develop in any acute condition of disease existing in an individual endowed with some peculiar constitutional characteristic which allows the accident to take place. Acidosis may appear in mild form, or may be sudden and overwhelming; these latter cases are true cryptogenetic forms. He felt convinced that many cases of cyclic vomiting in children and of vomiting of pregnancy are due to this cause.

**Dr. Roy** said that Dr. Kober's remarks upon the intestinal origin of the offending acids in this condition recalled that Herter had been able to make acetone by the cultivation of certain bacteria upon gelatin plates, though in very small amounts. Dr. Roy suggested defective hydrolysis in intestinal digestion of fats as a possible source of the excess of fatty acids.

**Dr. Jas. Dudley Morgan** said that in Dr. Nichols' paper an intricate problem had been plainly and practically presented. With regard to the appearance of acid intoxication in diabetes, Dr. Morgan has found that he cannot give full amounts of hydrocarbons because they will not be fully oxidized; but he can give fats with benefit and without the appearance of any other abnormal substance in the urine than acetone, which may be entirely harmless. Mineral waters frequently are of benefit in diabetes and perhaps accomplish good by virtue of the alkalies contained in them. He suggested the possibility of some connection between the susceptibility of infants to acidosis and the fact that fats are frequently the disturbing element in infant feeding.

**Dr. Nichols** said that he had gone over the recent literature of

the subject and had found nothing to indicate that Von Noorden holds to the proteid origin of acidosis at the present time. It is well known that proteids may give rise to acetone, but not to acid intoxication. According to Waldeyer, acidosis appears frequently in the insane after periods of starvation. Hoppe finds the condition in well nourished insane, but believes that the acid intoxication antedates the nervous disease. With respect to the appearance of acidosis in morphin habitués, the condition cannot be attributed to the influence of the drug upon nutrition, as the symptoms appear only after the sudden withdrawal of the morphin. He thought that the theory that fats prevent the ready absorption of carbohydrates was purely theoretical. Intestinal fermentation as a cause of acidosis had been definitely dropped, as the condition may make its appearance when intestinal fermentation is at a minimum. As to faulty fat cleavage as a cause, that is an unproven idea. The acidosis of infants seems demonstrated to be due to excessive absorption of fatty acids; it is not of the acetone variety.

## THE DIFFERENTIAL DIAGNOSES OF THE CHRONIC NON-TUBERCULAR JOINT AFFECTIONS.*

By JOHN DUNLOP, B. S., M. D.,

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Within the past ten years much light has been thrown on the differentiation of the chronic joint cases, many of which have heretofore been grouped under the general term arthritis deformans. Much has been done in Germany and England to clear up the subject. In America the first adult orthopedic clinic was opened by Dr. Goldthwait at the Carney Hospital in Boston, and it was there that he was so successful in collecting a great number of these cases and working out a fairly complete clinical and pathological classification of this class of cases that had been, up to that time, so little understood.

Under the term arthritis deformans has been put practically all of the old chronic joint cases that were not definitely tubercular and which were so frequently spoken of as "rheumatic." Many terms have been applied to one or more of these types, and usually the term so applied covered more than one type as now differentiated, so that the older textbook descriptions are most confusing.

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Arthritis deformans is today, probably, the most common term applied, while such terms as chronic articular rheumatism, rheumatic gout and rheumatoid arthritis are still in vogue.

The classification suggested by Dr. Goldthwait, and adopted by the more recent observers, is the one I shall use in trying to separate these cases into more distinct classes. The importance of differentiating them will be recognized when one realizes that each group demands a special method of treatment and that the prognosis in each is so different.

The first group : *chronic villous arthritis*, is a term applied to a fairly common class of cases where the pathological condition is represented solely by changes in the synovial membrane, a condition which is not progressive, a point of distinct difference between this group and those to follow, and one which frequently affects the knee joint. The condition pathologically is found to be a relaxation of the synovial membrane, usually with one or more accompanying changes. Villi are almost certain to develop at the joint line where the relaxed capsule frequently gets caught between the upper and lower leg, causing a continuous irritation. These folds and villi are, in this way, often responsible for the symptoms of catching and locking of the joints. Such villi, due to the lowered tone of the joint, often undergo degenerative changes and form lipomata and joint mice, or rice bodies.

The symptoms of chronic villous arthritis are local and consist of restriction of motion, to a more or less degree, depending on the mechanical obstruction, with a varying amount of pain and tenderness on use. Swelling is a constant sign, and depends upon the amount of change within the joint, owing largely to the increase in size of the synovial membrane, but partially to the increase in the synovial fluid which is almost always present, due to the constant irritation of the rubbing together of the folds of the capsule ; this has led to the term "dry joints," being erroneously applied, on account of the creaking and grating sensation on motion.

Externally these joints appear normal, with the exception of swelling, but in acute exacerbations there may be a local rise of temperature and hyperemia.

Strain and lack of tone seem to be the exciting etiological factors in this group ; a majority of the knee cases are undoubtedly caused by flat foot.

Villous arthritis may accompany any of the inflammatory or otherwise diseased joints, but is then only recognized as a part of the general process.

The second group: *atrophic arthritis*, is termed by many rheumatoid arthritis, which has been the cause of so much confusion in differentiating these conditions.

The atrophic cases show a spindle-shaped swelling of the exposed joints in the early stages of the disease, caused by an effusion into the joint and a swelling of the synovial membrane. The skin is abnormally white, or has a tendency to a blueish color, due to a venous congestion over the affected joint, while the skin over the extremities is liable to be shiny, parchment-like, and covered with a clammy perspiration, signs of a lowered vitality of the part.

As the disease progresses the line of the joint becomes constricted, and in the late stages the joint line is usually smaller than normal; this atrophy is not confined to the joint, the muscles in the neighborhood becoming markedly atrophic also. The progress of the disease is most often slow, the time of onset in the different joints being frequently separated by several months or years. This point in the history is of great help in differentiating from one of the other groups, as will be shown later.

The onset is slow, seldom beginning before 30, and most often between 40 and 50. Women seem more subject to the disease, and the early symptoms are often associated with the menopause. Many theories have been advanced as to its etiology, but little has been proven. Probably the most popular theory at present is that it is due to a faulty metabolism.

The pathological process is one of general atrophy (as will be demonstrated in the illustrations). The cartilage is the first to show such atrophy; in the latter stages ulceration of the bone may occur and finally bony ankylosis, due to the irritation of the bared bony surfaces.

The third group: *hypertrophic arthritis*, represents those cases which are probably most understood. Osteo-arthritis is possibly the more common term. This group has been diagnosed "rheumatic gout" and, on account of the mistaken diagnosis, erroneously treated.

In the exposed joints those affected show an irregular swelling

at the joint line, unless there be a chronic synovitis accompanying, when the increased amount of fluid will give a general swelling. The irregularity of the swelling may be readily accounted for when we understand the pathological condition. The skin usually shows no change, and there is no clammy perspiration as in atrophic arthritis.

As the term implies, the condition is one of hypertrophy, and in differentiation from the last group, there is none of the atrophy which is so diagnostic. This hypertrophy takes place at the edge of the cartilage and in the early stages is cartilaginous, later becoming bone. In the milder form in the distal phalangeal joints this condition has been known as Haygarth's nodosities, or Heberden's nodes. In the more advanced forms large bony spurs may prevent joint motion or true bony ankylosis may take place. There is no thinning of the cartilage and no decrease in density of the bone. This point is of great importance in making the differential diagnosis. In many textbooks separate names have been given to this condition when affecting different parts; for instance, mono-articular forms of arthritis deformans is the term applied when it is present in but one joint, such as the hip, when it is commonly spoken of as morbus coxae senilis; when it is confined to the spine it is known as spondylitis deformans, or poker back; this latter condition may also follow infection, so must not be confused with it.

The onset of hypertrophic arthritis is most often during the latter period of life, seldom beginning before 40 or 50. There seems to be a definite relationship between many of the hypertrophic joints and trauma. The joints usually first affected are those most exposed, and in the cases where a single joint is involved one almost always gets a history of injury and often a series of injuries. This has been especially noticeable in the knee cases.

The fourth group: *infectious arthritis*, includes those cases following an infection which may or may not have been recognized. The process within the joint is slow in onset, as might be expected from a low-grade infection. The time of onset in the different joints is usually separated by some weeks (differing in this respect from the atrophic type, as the latter is apt to take months instead of weeks). There may or may not be a rise in temperature. The blood always shows an increase in the num-

ber of white cells and secondary anemia may be marked, this in contradistinction to the atrophic type. The lymphatic glands are almost always enlarged during the toxic stage. There are two forms of arthritis occurring from general infection, one where the organism attacks the joint tissues, and the other where the pathological process is due to a toxemia. In those cases where the organism is present the symptoms are naturally more severe and require much more care, both medically and from a mechanical standpoint.

The external appearance of the infectious joints resembles more closely the atrophic type, and in the early stage often the only means of diagnosis is the radiograph. The joint is apt to be more truly spindle shaped than in any of the other groups, and the constriction at the joint line, which appears late in the atrophic cases, does not occur. The skin may be congested over the joint, especially in the early stages, but the parchment-like skin is not characteristic. There may be a clammy perspiration, but this is also not so common as in the atrophic type.

In the milder forms of the infectious cases, in which we experience difficulty in making the diagnosis, the swelling of the joint is found to be due to a periarticular infiltration, a congestion and swelling of the synovial membrane and an increase in the synovial fluid. The cartilage does not show the characteristic thinning which is found at such an early stage in the atrophic group, nor does the bone show the general atrophy which is there so characteristic; on the contrary, the bone appears to be somewhat more dense, unless the disuse of the affected part has been of long standing, when a general atrophy takes place. If the infection has gone on to pus formation we find cartilage and bone destruction. This, however, could not be confused with the atrophy of the atrophic type.

Bone formation often takes place in the latter stage of the infectious group; this is especially noticeable in the gonorrheal and typhoid cases. This bone hypertrophy may closely resemble the hypertrophic group, as in cases of spondylitis and arthritis of the hip, shoulder and elbow, where there is a plastic bone formation. Other cases show spurs at the insertion of the tendons and fascia, a most common example of which is the spur at the insertion of the plantar fascia under the os calcis. The history of such cases is of great value, as the onset of the joint symptoms follows so closely the original infection.

Some authors claim the atrophic and hypertrophic groups to be different stages of the same condition, but those who have given the greatest attention to both clinical and pathological study have definitely proven that the conditions develop independently of each other, but that both may and do occur in the same individual.

A great point has been made by many of the importance of distribution of the affected joints as a help in diagnosis, especially in regard to the symmetry of the lesions. The hypertrophic group is probably the least symmetrical and frequently the number of joints involved is limited to one or two. The exposed joints are very characteristic in their irregularity of contour, and the only real difficulty of diagnosis in this group comes in the cases of the unexposed joints. There is undoubtedly more or less symmetry about the atrophic and infectious groups. As to the atrophic group little explanation can be given, as the etiology is unknown, but there is no reason why such a symmetry should not exist in the infectious cases, as the infection and toxines are probably entirely disseminated by the blood and lymphatic systems.

It is of the greatest value to differentiate these two groups, for the prognosis is so much brighter in the infectious cases, and the course of treatment should be outlined with especial reference to the diagnosis.

The fifth group : *chronic gout*, is little understood ; the number of cases seems to be remarkably few, and the chance for study has been very limited.

All the cases examined have shown deposits of urate of soda in the soft structures and about the joints and some bone absorption adjacent to the deposits. The bone change is quite different from any of the other types heretofore described, the destruction occurs either in the shaft or end of the bones, and appears in the radiograph like a punched-out area. Should this bone destruction take place at the joint line the radiograph might suggest the advanced cases of atrophic arthritis, especially where the cartilage is destroyed and the ends of the bone ulcerated ; but on closer observation other characteristic changes will not be found, such as atrophy of the cartilage and the adjacent portions of bone, the appearance of the member and the general distribution of the impaired joints.

Acute gout must not be considered in this grouping ; the clinical aspect of these cases is quite different and usually most suggestive, and the pathological process is of such short duration that bone change is not apt to be recognized, though the radiograph may be of assistance in making the diagnosis.

**Dr. Shands** said that the subject was one of great interest to orthopedists. As Dr. Dunlop had said, Goldthwait has done more to make clear the pathology and differentiation of chronic non-tubercular joint affections than any other man alive. Dr. Shands felt sure that many large joints are constantly being treated as rheumatic or tubercular which belong to the classes to which Dr. Dunlop has directed attention. Chronic villous arthritis of the knee joint is one of the most troublesome varieties, although such cases may be very mild at times. These patients are usually sent to the orthopedist very late, having been treated for a variable length of time for rheumatism.

Dr. Shands presented specimens from two cases of atrophic arthritis.

(1) A woman, age 48, had an injury to the knee. Three years later she came to him with the knee flexed and walking with crutches ; passive motion produced intense pain. The knee was forcibly straightened and was treated for a time with plaster casts and strapping, but without benefit. He then advised resection, and at the operation the joint was found to be completely disorganized.

(2) A man, age 35, had an injury to the knee. The joint had been going from bad to worse and the patient wanted the limb amputated. Resection was advised, but at the operation, in addition to complete disorganization of the joint, infection was present also, and amputation was done.

Among the varieties of infectious arthritis, gonorrheal joints are the most interesting and common. While the symptoms are perfectly plain, the muscular spasm is so great that treatment is often difficult and, unless skilful, much deformity may result from contractures. Infectious spondylitis, the typhoid spine described by Gibney twenty years ago, is interesting. The diagnosis should not be difficult if the history is well taken.

**Dr. Vaughan** had listened to the paper with much pleasure. Dr. Dunlop had followed Goldthwait's classification of the type of joint diseases under consideration. There may be much difference of opinion as to nomenclature in these cases ; textbooks usually follow Virchow's term, *arthritis deformans* covering all cases not due to some specific cause. Goldthwait has taken several stages of one process as distinct diseases, and has called them hypertrophic, villous and atrophic. This classification may serve very well for study and treatment.

The diagnosis of this variety of arthritis need not be very difficult. According to McRáe's paper upon the subject, the majority of patients with this disease are between 21 and 30 years of age, though it may be seen in young and old. Tuberculosis may be diagnosed without difficulty by finding tubercle bacilli, by the use of tuberculin or by the inoculation of guinea pigs. Rheumatism and gout are not so easy to exclude. The x-ray may become very valuable in arriving at an appreciation of the true pathology of these conditions and may be very helpful for diagnosis.

**Dr. Balloch** said that the profession throughout the world is under a distinct debt to Goldthwait for his attempt to classify these obscure joint affections. The question has gone begging at the hands of others; Goldthwait's classification will probably stand.

## SOME CLINICAL STUDIES IN ORGANO-THERAPY.*

By ISABEL HASLUP LAMB, M. D.,

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In presenting this subject for your consideration it should first be stated that no opportunity for original work in animal experimentation has come to me. I cannot hope to demonstrate the theories or certainties of the physiologic chemistry of those internal organs that have been used as therapeutic agents. What I have to offer is a summary of clinical observations, a resumé of results of actual therapeutic use of these products.

Is there anything of which it may be said, "See, this is new, it hath been already of old time which was before us." When Solomon said this, quite possibly he had had some personal experience in organo-therapy, either as a patient or an investigator, while seeking out the various labors and vanities he tells of, for a large number of animal substances were used before the time of Hippocrates.

The works of Paulus Aegineta, Celsus, Hippocrates, Pomet and Lernery, *James' Medical Dictionary* and *Quincy's Dispensatory*, contain long lists of various animal products. *Pomet's Complete History of Drugs* devotes 100 pages to animal medicines. I quote a specimen of his therapeutic logic: "The different degrees of volatility that are in animal substances give them different virtues

* Read before the Medical Society, March 11, 1908

one from another. So those which have so very volatile salts are deemed cephalick and diaphoretic. Those whose salts are less volatile have an aperitive virtue because the salts of those animals being heavier are more inclinable to precipitate and open the urinary passages."

The ancient materia medica was supplied from nearly every part of the animal kingdom and the "animal origin" branch of our modern materia medica compares with it, for almost every organ of beast, bird or fish has been used as a remedial agent. In 1869 Brown-Séquard advanced the now accepted theory that all glands, whether with or without excretory duct, give to the blood useful principles, the loss of which is felt when any of them are congenitally absent or destroyed by disease or surgical interference. In the following twenty-five years this theory was elaborated and applied by the work of Reverdin, Charcot, Ord, Gull, Horsley and many others.

The study of organotherapy offers many difficulties, not the least of which is the physiologic antagonisms, as, for example, of the thyroid and suprarenal, the devising of the best methods of administration, and the definite expression of the dose. Administration has been by mouth, both as food and medicine, hypodermatically and by grafting.

Before the active principles were evolved the entire fresh gland was given by mouth, and in some instances this method is still used, as shown by Halstead in a recent issue of Johns Hopkins Hospital Bulletin. The fresh juice is found unstable and not safely sterilizable, so that its hypodermic use has been discontinued. The fresh gland substances have been preserved by glycerin, but the physiologic effects of brain and nerve products are altered by this medium.

The active principle has been extracted from the thyroid, suprarenal and testicle. German investigators have shown that the thyroid contains large quantities of iodin and a small proportion of phosphorus. Abel and Crawford have established the chemical nature of the blood-pressure-raising principle of adrenalin, obtaining it nearly pure by means of the benzozol derivatives.

The use of organic products should follow a definite outline, as 1, physiologic action; 2, indications for use, as *a*, all conditions dependent on a loss or diminution in function of the organ under consideration; *b*, other conditions under which the physiologic

action of the gland would indicate use; *c*, empirical use; 3, contraindications; 4, preparation and dose.

As before stated, preparations of nearly every organ and tissue have been used as medicines, as pepsin, pancreatin, bile products liver acids, intestinal substances, kidney, spleen, lung, heart, brain, pituitary, thyroid, thymus, parotid, breast, ovary, testicle and *suprarenal*. The last has been more generally used, excepting, probably, the digestive enzymes, than any other gland product. Its therapeutic use gives, perhaps, the most brilliant immediate results, as the prompt blanching of bleeding surfaces, shrinking and paling of congested mucosae are striking and impressive. Suprarenalin has been called a cocaine saver, the ideal sure and safe heart stimulant, and an aid in eliminating shock when given before the administration of ether or chloroform anesthesia. For the careful working out of the physiologic chemistry of this result we are indebted to S. J. and Clara Meltzer in this country. As a result of their work this drug is shown to have a very different action on normal than pathologic vessels. As all physicians are familiar with its local use no more need be said on this head. Its use internally to check hemorrhage and relieve congestion has been with me equally satisfactory; indeed, in a case of *post partum* hemorrhage it seemed to act more promptly than ergot hypodermically, and in eight cases of menorrhagia where ergot was not tolerated suprarenalin proved a most valuable substitute.

Reports of its use with excellent results in stimulating sex development are on record, such use as has been suggested by autopsies on individuals in whom the suprarenals were congenitally absent and the sex organs entirely undeveloped. Along this line I have but one case to report, a girl of 16, very childish in appearance and a "bleeder." The suprarenalin was given to control and check nasal and aural hemorrhages and the tendency to bleed; during its administration the girl developed very markedly; menstruation began and she took on the appearance of womanhood. This may have been only coincident, I had not at that time read anything on an interdependent relation between the adrenals and sex organs, and only mention the case as suggestive.

*Thyroid.*—Investigation shows the thyroid to have two kinds of tissue and its study indicates two functions: 1, a morphologic

effect which if faulty, is illustrated by myxedema, obesity, etc., and, 2, a toxic or, perhaps, antitoxic effect, failure of which results in tachycardia and psychical disturbances. Late studies, particularly those of Halstead, would indicate this last function as dependent on the parathyroids. The herbivora seem less affected by loss of thyroid function than carnivora and man, and a low proteid ration seems to inhibit, in some degree, the full force of thyroid insufficiency. Sex development and activity seem so closely related to thyroid function that Dr. Robert Bell, of Glasgow, in 1897–8 was led to use thyroid in the menorrhagia associated with uterine fibroids and in epithelioma of the cervix. His results were so striking and satisfactory that the dessicated gland was soon widely used but not always in suitable cases. This gland seems to exert its beneficial influence upon epithelial structures, and its use in menorrhagia, metrorrhagia and leucorrhea would therefore be clearly indicated. Our President, Dr. Fry, in May, 1899, reported to the American Gynecologic Society some encouraging results from its use. Its effect upon fibroids is probably obtained either through stimulation of structures forming the tumor or by increasing the oxidizing power of the blood, with the absorption of the fibroid as a secondary result. I have but one case of its use in this way to report. A young colored woman 24 years old had been examined by two physicians, and on the recommendation of one of them she entered a hospital for operation. Some circumstances caused her to decide against an operation. She came to me in 1900 with a large fibroid not particularly hard ; in fact, at first I suspected pregnancy, but the excessive bleeding did not support this. She was given thyroid and continued to present herself for observation as often as possible for several weeks, then less often until within two months she had developed a tachycardia and exophthalmos, but the tumor was by this time so much diminished in size as to impress me quite suggestively. The drug was discontinued and the tachycardia and exophthalmos were finally corrected. I have not used thyroid in any other case of fibroids because of the untoward symptoms that may develop, but have given it in Graves' disease, sexual atony and in cretinism, a case of which I reported to the Society in 1904. My results in these conditions have been uniformly good, which I think is the general experience.

*The Ovary.*—Ovarian extractives have been classed by various investigators as vaso-constrictor, nerve sedative, emmenagogic and anti-anemic. That the secretion of the ovary has a very decided influence on the nervous system has been all too often demonstrated by the mental and physical wrecks that have resulted from double ovariotomies done for the relief of various ills that feminine humanity is heir to. Dr. Arthur Davison in 1902 reported some interesting statistics of the use of ovarian extracts. In 1906 L. Ross reported a case of exophthalmic goiter treated with ovarian extract with most brilliant results. In the *British Medical Journal* R. Y. Geach reports a case of insanity that reacted successfully to this medication, and Dr. Fry, already mentioned, reported to this Society a case of epilepsy cured by removal of ovaries. All these seem to demonstrate the presence of an internal secretion in this organ, in addition to its relation to ovulation.

While I have endeavored to show the uses of the other important organic products it is to the use of the *parotid* and *mammary* substances I shall particularly call your attention. In looking over the literature of these two substances I find that comparatively little has been written in this country concerning their therapy. Shober touches on the physiological chemistry of mammary extract, on which his reports are most enthusiastic, as also are those of Mallet, of New York, on the parotid. As in the use of thyroid, Dr. Robert Bell, of Glasgow, seems to have been a pioneer in the use of these substances in gynecology.

In 1898 I read Shober's article on parotid and mammary therapy and soon afterwards had an opportunity to make my first experimental effort in their use, the cases presenting this opportunity being apparently very poorly selected, but the pleasing results justified the effort and served as most excellent checks or controls in subsequent work. A woman presented herself at my service at the "Woman's Clinic" with a history of scanty menstrual flow and unbearable pain during the period; for these she usually took laudanum and whisky until comatose. The condition had followed an abortion at three months. Physical examination showed the uterus the size of a fetal head at term, the cervix large and congested, the canal so stenosed that a wire probe could not be introduced. She was given the parotid five grains three times daily and directed to report just before the next period.

She duly reported, stating that she had less pain in back and thighs than before. The examination showed that the uterus was smaller, the cervix, however, still stenosed. After this menstruation she reported herself much better; she had not needed the laudanum and whisky. The uterus had become much smaller and the probe entered to a depth of four inches. The parotid was continued and after the next menstruation she smilingly reported that her menstruation was painless and she had discharged many large clots. The uterus now was but little larger than normal, and a sound of average size was readily passed. She discharged herself as cured. She had had no other treatment than the parotid, by mouth.

Following this pleasing experience I began the use of the parotid in other cases of dysmenorrhea, irregular menstruation and various conditions of pelvic inflammation and congestion, in all of which the parotid was given with satisfaction, so that I can confirm the findings of Mallet, namely, that parotid substance seems to relieve menstrual pain in all cases, without reference to the alleged cause, to a much greater extent than any of the so-called uterine sedatives. It relieves the dull, aching pain referred to the back and ovarian region, the menstruation when deranged becomes regular as to period, the flow is less in quantity and of normal duration. During its administration pelvic exudates seem to soften and become more rapidly absorbed. The general health, strength, appetite and spirits improve and many annoying minor symptoms disappear.

It has been my custom to give parotid to patients who present any form of pelvic inflammation, except, of course, actual abscess, in conjunction with local treatment. In cases in which an operation is advisable this course not only relieves symptoms and improves the general health, but insures the operator a better outcome and happier convalescence.

In conjunction with mammary substance in the treatment of fibroids, the effect of the parotid on the inflammatory exudate so often found with them is most pleasing, and just here I would like to call attention to one phase in the course of parotid medication of which I have seen no mention in the literature. In nearly all my cases, after two or three months' administration the breasts have increased in size and become more firm. One patient said to me that she had never had a nipple till after this

treatment. I have thought that perhaps the various advertisers of "bust developers" know about this effect. I may also cite at this time two cases in which pregnancy occurred after parotid medication, and there was an abundant supply of milk, cases in which previously the patients had been unable to nurse their children.

In the treatment of sterility I have six cases to report in which pregnancy followed its use. I mean here by sterility those cases in which after five or ten years of marriage, conception has not occurred or there has been early abortion. In post abortive cases I have found its use most satisfactory, stimulating the absorption of the exudate, correcting the deranged function of the endometrium and relieving the dysmenorrhea.

Of the various pathologic conditions treated by me with this extract none has given more satisfaction to both physician and patient than the following two cases, one of which I will give in detail. A woman, Mrs. P., age 29, had had a double ovariotomy done ten years previously for the relief of dysmenorrhea. Following the operation there was but little of the distressing nervous symptoms, but atrophy of the genital organs with *dyspareunia* was marked. With the aid of cocain a vaginal examination was made with a small rectal speculum and follicular vaginitis found. Nothing beyond a light touching of the follicles could be borne. She was given parotid five grains in the belief that the excessive scar tissue might be partly responsible for the pelvic condition that was found. Two weeks of this medication brought about a little more elasticity of the vaginal structures and then local treatment was begun. In two months the vaginitis had disappeared and a full sized speculum could be introduced and opened. The thigh pains and hot flushes had disappeared and conjugal relations had been comfortably established.

*Mammary Extract.*—Excepting Shober and Mallett most investigators dismiss this organ from the therapeutic list with a few words, simply citing those two authors and some foreign writers on gynecology who also have mentioned it. As both Mallett and Shober have reported each only a few cases it seemed to me worth while to place special stress on my use of this gland, as my dispensary and private case books during nine years show 110 cases treated with this product.

The well-known relation and interdependent action between

the mammary gland and uterus, as shown by the changes occurring at puberty, pregnancy and the puerperium, led to the use of this product in gynecologic practice.

Shober has shown that the active principle is probably a nuclein ; investigation indicates a very complex structure containing a nuclein, a carbohydrate and a proteid radicle ; these may be the antecedents of casinogen and lactose. The nuclein bases do not seem to be excreted, but remain in the gland probably for the formation of more mother substance. These bases constitute the most useful part in therapeutics.

Thyroid is a powerful lymph stimulant and acts on the epithelial structures and blood supply. Mammary seems to exert its influence on muscle fiber, increasing contractile power.

Of my 110 cases all but 10 were kept in sight for periods varying from several months to several years. The 10 were lost sight of within two months or less, so that there remain the 100 cases, and in all these in no instance did the administration of mammary extract fail to relieve the symptoms. In about half the cases some form of local treatment was used in conjunction, but except as an aid to more prompt alleviation no credit can be given to it. In every case marked and permanent improvement was the result. I have used this preparation in every case of uterine fibroids coming under my care, whether operation was advisable or not. The tumor is always reduced in size, pressure symptoms disappear, the menses become regular as to period, normal in duration and quantity, the headache, pain and insomnia disappear, and the history of one case is the history of all.

In but four of my cases did the tumor seem to entirely disappear ; fifteen that I know of have been operated on with successful outcome. Quite a number of patients are still holding on to their tumors but seem to be entirely comfortable and answer all demands on their daily lives. During the past four months 7 cases have been treated with mammary extract ; 4 fibroids, 1 menorrhagia, 1 subinvolution, 1 metrorrhagia. Of the 4 fibroid cases 2 have left the city, but send report that the subjective symptoms have been much relieved ; 2 are still under treatment ; in these the adhesions have loosened up, the tenderness has disappeared, the menses have become regular and painless, the headache and insomnia relieved. One case, that of a school teacher, will likely come to operation by summer time, but she

will apparently be able to finish her school year in comfort. The previous intractable insomnia has yielded to the treatment and she gets six or seven hours of quiet sleep. I should say that in the first two weeks of treatment evening doses of triple bromides were given; since then only the mammary substance.

The case of menorrhagia is associated with the climacteric; the patient has had two pelvic operations. I have made no examination, so that the symptom menorrhagia is so far the only means of classification. At my first visit this patient was nearly exsanguinated, suffering with pain, nausea, headache, restlessness. Of course, opium and ergot were used for the acute symptoms, afterward mammary substance, with the usual comforting results. The next menses were much less in quantity and the interval three weeks; except for cramping pain and insomnia, the patient got along very well. Three weeks later the next menses appeared and were normal in quantity and character; there was still some pain, but she did not go to bed and seemed surprised at what she called a little bit of flow. The fourth menstrual effort has appeared at an interval of four weeks, without pain or headache, and she keeps about her daily work.

In the case of subinvolution are some points of interest. Her first labor ended somewhat prematurely and in eclampsia, with instrumental delivery. When she came under my care, three months afterwards, the head symptoms were very annoying; dizziness, nausea, inability to concentrate her attention; urine still contained albumin and casts; uterus retroverted, soft; os patulous, canal five inches deep. A course of local treatment was begun in the hope of betterment, and, remembering the beneficial effects of thyroid in threatened eclampsia, I prescribed it. After one month's treatment the uterus was only half an inch less in depth, the other symptoms were unrelieved, the menses very scanty and of short duration. She was now given mammary substance, and after another month the uterus was found much firmer, the retroversion diminished, the canal three inches deep. I now sent her to Dr. Richardson for treatment for otitis media, and the dizziness improved along with the other head symptoms. Urinalysis showed an increase in urea, the number of casts diminished. Her menses were free and of normal duration. At the last examination the uterus was normal in size, position and depth, and the menses normal in quantity and dura-

tion. She is at present in the west, and reports continued improvement, a trace of albumin but no casts in the urine. Head symptoms rare.

The case of metrorrhagia was in a woman of rather frail type, nervous temperament, menses recurring at intervals of three weeks to twenty-six days. She had been married ten months; was anxious for children. She was given mammary substance with the result that in the next two months the twenty-eight-day interval was established, and conception occurred after the second regular menstruation.

It may be said in conclusion that in the cases reported, in so far as was possible, the element of uncertainty has been eliminated. In a large percentage of my fibroid cases the diagnosis has been confirmed by examination under ether. It may be argued that results were slow of accomplishment as compared with surgical methods. This is true, but surgical methods invalidate patients for a month or more, during which time the earning capacity of the individual is *nil*, not reckoning the discomfort and expense. Again, organotherapy should not be a substitute for surgical remedial efforts, but an aid thereto.

In the case of the large, bleeding fibroids of women under 35 years of age I should always advise operation, and at the same time endeavor to prepare the patient for the surgeon's work.

As to the length of time of administration of the remedy, I should say that definite results can hardly be expected under two months of treatment, and the best results follow a longer period. Shober advises a treatment of two years, and I have always urged that length of time, although occasionally interrupting it for a month or two during that time.

**Dr. I. S. Stone** said that the paper opened up an important field of therapy, in the treatment of border-line gynecological cases —the treatment preparatory to operation and the management of non-operative cases. He had had little experience with organotherapy in gynecological practice; he had used adrenalin, ovarian and thyroid extracts. He was sorry to say that thyroid extract had proved disappointing in the hands of many gynecologists; the impression is general that the exhibition of the preparation for the treatment of fibroids may be followed by degenerative changes to a greater degree than if they were left alone. One lesson taught by the paper was that therapeutic agents capable of producing the powerful effects demonstrated in Dr.

Lamb's cases are worthy of careful trial and must have important potentialities.

**Dr. Lochboehler** had been disappointed in the use of adrenalin for the treatment of epistaxis. In several instances he packed the nostrils with gauze saturated with adrenalin solution without effect. He asked for the experience of others with its use.

**Dr. R. S. Lamb** said that the internal administration of adrenalin chloride produces a better hemostatic effect than the local application. He had seen it used thus in the treatment of post-tonsillectomy hemorrhage with very prompt result.

**Dr. Reyburn** said that at one time he had been very enthusiastic over thyroid-extract therapy for fibroids, but he had found that nearly all fibroids sooner or later must come to operation. Organotherapy is a field that ought to be very thoroughly worked over. Surgery for tumors is a reproach to the science of medicine; it is a failure of the healing art; instead of conserving organs, we are obliged to destroy them. He congratulated Dr. Lamb upon the high quality of her paper.

**Dr. Wood** said that an interesting therapeutic effect of adrenalin may be observed in the treatment of coryza; the tumefaction of the nasal mucosa may be quickly reduced by this drug used either internally or in spray. In hay fever, the administration of one-grain or two-grain tablets of the extract will afford much relief. Adrenalin is much more effective in hemorrhage when given internally. In asthma, it produces a very quick and almost marvelous effect; but it quickly loses its efficacy and may be useless in a second attack, unless a considerable interval elapses after the primary administration.

**Dr. Chappell** asked what preparations of the various organs had been used by Dr. Lamb? Were they the ordinary commercial preparations?

**Dr. Lamb** replied that she preferred Armour's and Burroughs' and Wellcome's extracts. The latter firm makes the best thyroid extract, although the products of both Armour and Parke, Davis & Co. are very good. The dose is usually one five-grain tablet thrice daily with food. The effects of thyroid extract must be very carefully watched.

**Dr. J. Dudley Morgan** inquired if Dr. Lamb had had any experience with the use of fresh spleens in the treatment of leukemia.

**Dr. Lamb** replied that she had had no experience with the use of spleen substance, but that the reports from others have not been encouraging. The same may be said of kidney substance. She was sorry there had been no discussion of the use of mammary extract; her widest experience had been with this agent. She had been able to find only ten cases in the literature in which mammary extract had been used.

# PERKINS' METALLIC TRACTORS.*

By D. S. LAMB, A. M., M. D.,

Washington, D. C.

It is now more than 100 years since the invention by Dr. Elisha Perkins of his metallic tractors. Dr. Perkins was born at Norwich, Conn., January 16, 1741. He died in New York City, September 6, 1799. He was educated by his father to be a physician, and practiced his profession in Plainfield, Conn. He was a member of the county and also the State Medical Society, and apparently in good repute. His genealogy was published, and from it we would infer that he came of good family.

The story of how he came to invent the tractors is told by his son, B. D. Perkins, who also is said to have been a surgeon, in a book published by him in London in 1799, entitled "The influence of metallic tractors on the human body in removing various painful inflammatory diseases, such as rheumatism, pleurisy, some gouty affections, &c., &c.; lately discovered by Dr. Perkins of North America; and demonstrated in a series of experiments and observations, by Professors Meigs, Woodward, Rogers, &c., &c., by which the importance of the discovery is fully ascertained and a new field of enquiry opened in the modern science of galvanism or animal electricity. Second edition."

He says that his father, Dr. Perkins, had for many years believed that metals had an influence on the human body, unknown to physiologists. "The first remarkable incident that presented itself to the notice of Dr. Perkins was the sudden contraction of a muscle when he was performing a surgical operation. This he observed regularly whenever the point of a metallic instrument was put in contact with muscle. Struck with the novelty of the appearance, he was induced to try points of wood and other substances, and no contractions taking place on these experiments, he thence inferred that the phenomena could be ascribable only to the influence of the metal. He also noticed that when a knife or lancet was applied to separate the gum from the tooth, the pain ceased; and also that the accidental application of a metallic instrument to inflamed and painful tumors previous to incision gave momentary ease."

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*Read before the Medical Society, March 11, 1908.

At this time came the news of the discovery by Galvani of the action of metals on nerve and muscle fiber. Perkins made instruments of different metals, both simple and "compound," and experimented for several years with more or less success. He found that by drawing over the diseased parts certain instruments formed from metal substances of certain shapes he could remove chronic rheumatism, some gouty affections, pleurisies, inflammations in the eyes, erysipelas, tetter, violent spasmodic convulsions as epileptic fits, lock jaw, the pain and swelling attending contusions, inflammatory tumors, the violent pains occasioned by a recent sprain, the painful effects of a burn or scald, pains in the head, teeth, ears, breast, side, back and limbs, and indeed most kinds of painful topical affections which came under his care and observation.

He reported his discovery to the Connecticut Medical Convention about the close of the year 1795. The impression he made there was that the operation of the metallic influence was a revival of animal magnetism or mesmerism, which had fallen into disfavor. Perkins then went to Philadelphia, which was the center of medical knowledge at that time, and where the National Congress was then in session. He repeated his experiments there before not only the most eminent physicians but also the most distinguished persons in the United States. We are told that General Washington himself, convinced of the importance of the discovery from experiments in his own family, bought a set of the tractors for their use. The Chief Justice of the United States, Oliver Ellsworth, wrote Perkins a letter of recommendation to John Marshall of Virginia.

It was on the advice of some friends, so we are told, that he patented his invention, the patent giving him the "exclusive right of making, constructing, using and vending to others to be used, his pointed metallic instruments, in removing various pains, etc."

During his absence from Connecticut the State Convention reassembled and voted its belief that the influence in Perkins' tractors was animal magnetism, and "directed their secretary to cite any member of their society practicing as above (*i. e.*, using the tractors) before them at their meeting to answer for his conduct and render reasons why he should not be expelled the society for such disgraceful practices."

It is stated in the book quoted that the tractors do not relieve pain in parts of the body to which oily applications have been made; even sweating interferes. Chronic pains, mercurial or venereal, were not radically removed by the tractors and, in the hands of *some* persons the tractors were utterly useless. This last statement is very suggestive.

At the meeting of the State Medical Society of Connecticut in 1797, at Hartford, the following resolution was adopted (see *Boston Med. and Surg. Jour.*, 1860, LXIII, p. 181): "Whereas, Dr. Elisha Perkins, a member of this Society, having obtained a patent from under the authority of the United States, for the exclusive privilege of using and vending certain *pointed metallic instruments*, pretending that they were an invention of his own; and also that they possess inherent powers of curing many diseases, which is contrary to rules and regulations adopted by this Society, interdicting their members the use of nostrums, therefore voted that the said Elisha Perkins be expelled from the Medical Society of the State of Connecticut."

The tractors were two slender metal rods, one of brass, the other of steel, flat on one side, convex on the other, and tapering to a point; they were carried in a tortoise-shell case, and were sold for five guineas the set, about $25. This, of course, was far beyond their real value. Their construction was kept secret; it was given out that they were of a peculiar composition. The manner of their use was to draw them downward over the affected part for about twenty minutes.

Perkins did not live long after his invention. During an epidemic of yellow fever in 1799 in New York City he went there, but for what purpose is disputed. His son states that the father had invented also an antiseptic medicine, and had used it successfully in dysentery and ulcerated sore throat, and that he went to New York to try the medicine in the prevailing fever, especially in the case of those too poor to employ a physician. Others state that Dr. Perkins tried the use of the tractors in those sick of the fever, and, having contracted it himself, had them used on himself, but the experiment failed, and he died of the fever. After his death the tractors rapidly fell into disuse in this country; abroad somewhat later.

A very interesting fact in connection with the invention is the popularity it acquired among members of the profession, physi-

cians and surgeons, both locally and at a distance. In Connecticut more or less of the profession used the tractors and recommended them. Abroad, especially in England, the invention was exploited by Perkins' son, B. D. Perkins, who opened an office in Leicester Square, in the former home of the great surgeon, John Hunter, and thus at the outset had some of the prestige of the place. As had been done in the United States, he published in London a series of cases successfully treated with the tractors. Several editions were printed, beginning in 1799. One of these is entitled: "Experiments with the Metallic tractors in rheumatic and gouty affections, inflammations and various topical diseases as published by Surgeons Herholdt and Rafn, of the Royal Academy of Sciences, Copenhagen; Translated into German by Professor Tode, Physician to His Danish Majesty, thence into the English language by Mr. Charles Kampfmuller. Also reports of about 150 cases in England, demonstrating the efficacy of the metallic practice in a variety of complaints both upon the human body and on horses, &c., by medical and other respectable characters. Edited by B. D. Perkins, A. M., son of the Discoverer."

As may be surmised the text of these reported cases is very like similar statements of today and covers nearly all the ills to which humanity is heir.

Perkins' son states that he came to London to devote his time and attention to the diffusion of the discovery and its application to the relief of the miseries of mankind; that the five guineas that he charged for the tractors was not a high price, that the consideration was but trifling if they produced their salutary effects even in one-half the cases in which they would be used. He said that the tractors could never be productive of injury: "The tractors produce no effects in any diseases except those in which there is present an extra degree of that *principle* which is the cause of the disease, and as they perform the cure by taking off only this excess and restoring the equilibrium, it will be readily perceived that they can have no influence, either injurious or salutary, in complaints of the opposite class, viz., those which arise from a diminution of that principle." This was about the only explanation of the action of the tractors that was offered; the father appears never to have offered any.

Dr. John Vaughan, of Wilmington, Del., published in 1797 at

Wilmington, a pamphlet entitled "Observations on Animal Electricity in explanation of the metallic operation of Dr. Perkins." Vaughan was a member of the Medical Society of Delaware. His pamphlet was addressed to the American Philosophical Society. He includes in the pamphlet a letter from Dr. James Tilton, the President of the Medical Society of Delaware. This letter concludes as follows: "By publishing to the world the thoughts which you have digested and arranged on animal electricity, and the manner in which it explains the metallic operation, you will, at least, invite discussion and may profit with the rest of your brethren by the event."

C. C. Langworthy, of Bath, England, Surgeon, published in 1798 a book entitled "A view of the Perkinean Electricity or an Enquiry into the influence of Metallic Tractors, founded on a newly discovered principle in nature, and employed as a remedy in many painful inflammatory diseases, as rheumatism, gout, quinsy, pleurisy, tumefactions, scalds, burns, and a variety of other topical complaints, with a review of Mr. Perkins's late pamphlet on the subject, to which is added an appendix containing a variety of experiments made in London, Bath, Bristol, &c., with a view of ascertaining the efficacy of this practice. Second edition, London." He adds to the diseases named in his title page the following: inflammation of the eyes, ringworms, tetters, whitlows, erysipelas, pains, swellings and inflammations caused by the stings of insects, by contusions; spasmodic affections, St. Vitus dance, epileptic fits, sprains, nervous fever (typhoid), toothache, nervous headache, locked jaw, pains in breast, back, ears, &c.

So large a patronage did the tractors receive that in July, 1803, a large house was opened in London devoted to the use of the tractors and said to be mainly for the poor. Lord Rivers was president of the corporation. Their first report, which, of course, was favorable to the use of the instruments, concludes with the hope that the British Parliament would honor Perkinism with the same patronage as other modern discoveries for the benefit of mankind.

No doubt the continued popularity of the tractors was partly due to the support given by the profession itself, just as at the present day the use of some proprietary medicines is promoted by the recommendation and prescription of the physician. Of

course there was much opposition to the use of the tractors, especially by physicians. The secular press represented both sides. Perkins was kept busy defending his claims. One interesting item in the literature is the production of a Thomas Green Fessenden, a resident of New Hampshire, but then living in London. Under the pseudonym of Christopher Caustic he published a small book entitled "Terrible tractoration; a poetical petition against galvanising trumpery and the Perkinistic Institution; in four cantos. Most respectfully addressed to the Royal College of Physicians, London; second edition, 1803. "(The first edition is said to have been sold in two months.) 186 pages, with profuse footnotes. An American edition was published in 1804, New York City, revised and corrected by the author, and a second American edition in 1806, the title of which was amended to read "The modern philosopher, or terrible tractoration;" 271 octavo pages.

Of the caricatures that appeared at the time one, at least, has been preserved, printed in London by H. Humphrey, St. James Street, Nov. 11, 1801; the artist was J. Gillray. The legend is

"Metallic Tractors." It shows the patient, a large, portly man, with well-marked rosacea of his nose, sitting in a large arm chair; the doctor stands before the patient, holding in his teeth one of the tractors and with the other is extracting flames from the rubicund nose, at which the patient shows great fright, and a dog beside him adds to the interest with his howls. A round table holds a bottle of brandy, a glass and spoon, a pitcher of hot water, a bowl with loaf sugar, a pipe of tobacco and a watch. Evidently the medical attention is being timed. On the wall hangs a picture representing a naked child astride a liquor cask, and holding in outstretched hands a bottle and drinking glass. On the table also is a sheet of paper containing the following legend: "The true Briton Theatre. Dead alive. Grand exhibition in Leicester Square. Just arrived from America the rod of Aesculapius. Perkinism in all its glory, being a certain cure for all disorders, red noses, gouty toes, windy bowels, broken legs, humpbacks. Just discovered the grand secret of the Philosopher's stone, with the true way of turning all metals into gold, pro bono publico." I may add that the copy of the picture, which I show you, belongs to the Library of the Surgeon-General's Office, and was presented thereto by Dr. D. W. Prentiss, formerly a member of this Society.

Baas, in his "History of Medicine," Stuttgart, 1876, translated by Handerson, New York, 1889, says that probably the most magnificent piece of medical imposture in the western world in the eighteenth century was Perkinism, and adds that it is uncertain whether Perkins was an intentional deceiver or was himself deceived.

Mumford, in his "Medicine in America," Philadelphia, 1903, calls it "The Legend of Perkins and his Metallic Tractors," and adds that Perkins was a man, six feet tall, handsome, of commanding personality, full of that intangible something that women call charm and men call magnetism. It was his forceful presence and kindly ways that, when he laid his hands on a patient, gave a sense of benefit and well being. Although he patented his tractors and exploited them he did not lose caste altogether among his medical brethren, but was consulted by many physicians of high standing.

I, myself, have been impressed, in looking over the literature of this subject, with the thought that, as Baas has said, perhaps

Elisha Perkins was, himself, deceived. Galvani's and Benjamin Franklin's discoveries in electricity were fresh in mind and could not fail to stir up the thoughtful physician. The one lesson, in particular, that we learn is that persons recover from disease by many remedies, of which the psychic is not the least.

## CASE OF DOUBLE UTERUS.*

By W. P. CARR, M. D.

Washington, D. C.

The specimen was removed from a colored woman operated on for uterine fibroids. At the operation a hard mass was found low down on the left side of the uterus in the normal position ; this mass was at first thought to be a fibroma ; on examination, however, the left fallopian tube was found to enter this mass, and on incision a cavity was demonstrated within which communicated with an os uteri, common to this small uterus and the larger, normally situated uterus. The latter had a single tube and ovary. Both uteri were the seat of fibromata.

**Dr. G. Brown Miller** had seen several instances of double uterus. Four years ago a case was encountered at Columbia Hospital in which there was both double uterus and double vagina ; one side was the seat of a gonnorrheal inflammation, while the other side was free. He mentioned a case of Dr. Howard A. Kelly's in which pregnancy occurred in a rudimentary horn, with rupture and death from hemorrhage.

Nostrum Prescribing Physicians.—As one result of my investigation of this question there has come to me an amount of evidence as to the unintelligent prescription of secret proprietary medicines on the part of physicians that, if published, would tend to cause an amount of unrest and distrust on the part of the public that is mighty unpleasant to think of.—Bok, *Jr. A. M. A.*

*Reported with specimen to the Medical Society, March 11, 1908.

# CASE OF STAB-WOUND OF HEART.*

By G. TULLY VAUGHAN, M. D.

Washington, D. C.

The patient, a colored man, 34 years old, was stabbed in the left breast February 1, 1908. The knife entered through the third intercostal space at the inner side of the nipple. The man was brought to the Emergency Hospital 45 minutes later; his extremities were cold and he was in a lethargic state from the effects of alcohol. A probe introduced into the wound passed downward and inward and indicated that the chest had been penetrated; an incision seemed to be justified. The usual incision for exposing the heart was made: beginning at the sternum, along the third rib to the stab wound, thence following the wound, it was carried downward to the sixth rib, and thence inward to the sternum. The intercostal muscles were divided, the fourth rib cut with bone forceps, the fifth and sixth ribs divided at the costal cartilages and a flap turned back, using the costosternal articulations as a hinge. The pericardium thus laid bare was found covered with blood; this was cleaned off, a three-inch incision made in the pericardium, and active hemorrhage was stopped by packing the pleural cavity. A small incision in the right ventricle could now be made out, from which feeble bleeding persisted. The blood could be effectually stopped by pressing the edges of the wound together; the wound was closed by continuous silk suture, but oozing persisted from the needle holes. A second row of silk sutures, ten in number, was then introduced; oozing still persisted from two stitches. These sutures were caught up and a catgut ligature thrown around both stitch and adjacent tissue; the wound was now completely dry. There was now no fresh blood in the pericardium. The cavity was wiped dry and closed with catgut. Much blood was found in the pleural cavity; this was carefully cleaned out. The lung was found to be completely collapsed and was represented by a little bunch at the apex of the thorax. The osteoplastic flap was turned back, and everything was sewed up air tight. It was thought best to open the chest again later, if it should become necessary for any reason, rather than leave any drainage in the wound.

* Reported to the Society, March 11, 1908.

The pulse improved as soon as the wound closed; Dr. Samuel Fry was present at the operation and observed the pulse throughout; the average rate was 120. The second day the pulse varied from 120 to 140, and continued so for several days; no stimulants were given except a little digitalis. On the fourth or fifth day delirium tremens appeared, and it was learned that the patient had been an habitual drinker. He improved under whisky, given in two-ounce doses every two hours; the pulse became stronger and the mentality lucid. The whisky was then cut down in quantity, but after two days he again became delirious; the whisky was resumed and improvement was again noted. He is still taking three drinks a day and may now be called well. On the tenth day the lung was found to be completely expanded. There was some cough and pneumonia was feared, but the cough disappeared. The temperature was a little elevated at times. The patient sat up in bed on the twenty-third day. The wound was dressed at the end of two weeks; union was primary. In a little less than four weeks the man was out of bed.

According to a recent article in the *Journal of the American Medical Association*, there have been nine cases operated on in the United States for penetrating wounds of the heart; five of these were successful. Six years ago Dr. Vaughan had read a paper in which all the cases reported at that time were collected—23 in all. Many cases reported as repair of wounds of the heart are erroneous; the case of Williams, of this city and Chicago, was really repair of the wounded pericardium and not of the heart. Dr. R. Harvey Reed in 1887 published the first report of suture of the pericardium.

**Dr. Balloch** said that the Society was to be congratulated upon having this successful case presented to it, and upon the fact that the operator is numbered among its members. As to the incision for exposing the heart, there have been devised some 25 or 30 different procedures; most operators, however, suit the incision to the exigencies of the case. An Italian surgeon has pointed out that for simple exposure of the heart it is only necessary to pry the ribs apart, without division; this would not be sufficient if suturing of the heart wall were necessary. Pressure on the vena cava for a few minutes is permissible without injury, it is said, and may be very useful to control bleeding. The oozing at the stitch holes was an interesting feature in Dr. Vaughan's case; the control of the stitches by ligature was ingenious and original.

**Dr. John D. Thomas** had auscultated this patient's heart several weeks ago; his examination had to be made with the dressings in place, and the sounds were indistinct. After the dressings were removed, the second sound was found to be unexpectedly clear; the first sound was very muffled. At present both sounds were of good quality, but not perfect. He was interested in the expansion of the completely collapsed lung. Although there are still some rales present and some atelectasis still persists, the lung is a very good one The atelectasis may never be entirely overcome, as the lung cannot advance entirely into the pleural recesses as normally it does in full inspiration.

**Dr. Van Rensselaer** inquired as to the behavior of the heart during the introduction of the sutures. Was there any difficulty in placing the stitches, with the heart pulsating at the rate of 120 to the minute?

**Dr. G. Wythe Cook** inquired if Dr. Vaughan apprehended any future trouble from the silk sutures, two of which had evidently penetrated to the interior of the ventricle, as evidenced by the oozing. Did he anticipate any secondary accident from this source?

**Dr. Hasbrouck** congratulated Dr. Vaughan upon the tenth successful case of the kind in the United States. When Dr. Hasbrouck was a resident at the Emergency Hospital, he saw a patient who lived for three hours after receiving an extensive injury of the heart. He had been so impressed by the circumstance that he looked up the literature upon heart injuries, and had found many instances of more or less prolonged tenure of life after receipt of the injury. The reports seemed to show how many might possibly be saved by resorting to prompt surgical intervention.

Among the cases of *slight* injury in which life was prolonged for some time was a punctured wound of heart, half an inch long, in the right ventricle; the treatment was ice internally and externally; the patient lived four days. 2. Knife wound 1.5 inches long; no treatment; lived 21 days. 3. Bayonet wound several lines long in right ventricle; no treatment; lived 16.5 hours. 4. Puncture of right ventricle by needle; no treatment; lived two days.

Cases in which the injury was *severe* but life was prolonged for some time:

Case 1. Perforating shot wound right ventricle; wound of exit $\frac{5}{8}$ inch in diameter; treatment, transfusion and stimulation; lived over three hours. 2. Stab wound both ventricles, perforating both cavities; no treatment; lived ten days. 3. Pistol-shot wound right auricle and ventricle; bullet penetrated both cavities and descended the vena cava; no treatment; lived 97 hours. 4. Stab wound, both ventricles; knife entered just to left of ventricular septum, passed partly through it and emerged through

right ventricle; no treatment; lived five days. 5. Bayonet wound right ventricle; weapon entered at lower border of ventricle and emerged near valve; no treatment; lived nine hours. 6. Pistol-shot wound left ventricle, penetrating the cavity and lodging at auriculo-ventricular junction; no treatment; lived four days. 7. Shot wound left auricle and ventricle; bullet entered auricle and dropped into ventricle; venesection; lived four days, 18 hours. 8. A criminal; punctured wound left ventricle; transfixion by bayonet; lived 29.5 hours; was then executed. 9. Knife wound right ventricle; opening in ventricle one inch long; involved center of diaphragm and adjoining part of liver; no treatment; lived 36 hours. 10. Sword thrust through both ventricles; heart transfixed; no treatment; lived four or five days. 11. Bayonet wound left ventricle; entered ventricle 1.5 inches from apex and emerged near interventricular septum; no treatment; lived four days.

Cases of severe injury in which life was much prolonged, teaching us that we should do all we can for even cases that at first appear hopeless.

1. Shot wound, right auricle and ventricle; bullet penetrated auricle from ventricle; opening in ventricle half an inch long; circular opening in tricuspid valve; bullet remained in auricle; no treatment; lived 14 days. 2. Punctured wound right ventricle, by stick blown from gun breech; the stick, three inches long, lodged in ventricle, one end pressing against extreme part of ventricle near apex; part of tricuspid valve torn away; the stick was covered by a thick clot, size of a walnut; no treatment; lived five weeks two days. 3. Stab wound left ventricle by iron stilet that remained firmly fixed in heart substance; no treatment; lived 20 days. 4. Shot wound left ventricle; bullet lodged in ventricle; no treatment; lived over two months. 5. Wound of both ventricles; piece of wood blown from gun breech; entered left ventricle and thence penetrated right; venesection; lived 47 days. 6. Stab wound right auricle and ventricle; several fissures in right side of heart; one admitted a probe for half an inch, penetrating right ventricle and divided papillary muscles of tricuspid valve; large opening also in right auricle; no treatment; lived 24 days.

**Dr. Vaughan** replied to Dr. Cook that he did not anticipate any trouble from the sutures. His experience as to the disposal of silk sutures was that if they are not absorbed, the stitch will follow the knot, and in this case if the sutures become displaced they will fall outside the heart. They should produce only a slight and transient disturbance of the endocardium. The motion of the heart caused no difficulty in placing the sutures; it was not necessary to wait for diastole or systole, but by taking the heart "on the fly" the needle could be placed at any point desired. The beat may best be described as a sort of squirm, and the

heart may be taken in the hand without causing any appreciable disturbance of its action. H. Lorenz has described a new method of exposing the heart; he cuts across the sternum at the upper and lower limits of the praecordium, divides it from the ribs on the left, and turns back a flap to the right including a small portion of the right costal cartilages. The advantage of the method is that the pleural cavities are not opened and collapse of the lung is avoided.

## CASE OF OSTEITIS DEFORMANS.*

By JESSE H. RAMSBURGH, M. D.

Washington, D. C.

A. S., white, unmarried, age 68. Had had but few of the diseases of childhood. History negative as to tuberculosis and syphilis. When 15 years old he fell and broke his arm, and during his early manhood broke both arms several times; every slight fall or unusual muscular exertion resulted in fracture of some bone. Once, on trying to slide back the door of a street car, fracture of the clavicle occurred. In 1887 his figure was erect and he was very active both mentally and physically; but about that time he began taking some medicine for "brittleness of the bones." His bones seemed to soften; his stature diminished; his chest acquired a barrel shape; the long bones curved anteriorly; the bones of the skull enlarged and acquired a disproportionate shape. During the last five years of life the enlargement of the skull was rapid. The occipito-frontal circumference was 26½ inches, and from the tip of one mastoid process over the crown of the head to the tip of the other was 19 inches. He died December 15, 1907.

**Dr. D. S. Lamb** said that he had performed the autopsy in Dr. Ramsburgh's case—the examination being limited to the head. The brain was normal; the dura slightly thickened; the meningeal vessels somewhat larger than normal. The bones of the skull were soft—so soft that an instrument could be run deeply into them without much effort; the skull was much thicker than normal, distorted and nodulated.

The scalp was thin; weight of the calvarium, 28½ ounces. Pituitary gland and fossa normal. The brain itself was normal to the naked eye; weighed 54 ounces. The entire body was pale.

*Reported with specimen to the Medical Society, January 29, 1908.

The long bones of the limbs showed well marked osteitis deformans.

Paget was the first to describe this disease, in 1876. Up to 1901, only 66 cases had been recorded. The disease seldom appears before middle life, is found mostly in the male sex, and may last many years. Death is usually due to dyspnoea. There are many specimens in the Army Medical Museum, mainly from the Indian mounds ; the disease, therefore, must have been rather common among the mound Indians. The pathological process is a rarefying inflammation, going on to exudation and softening. The cause is unknown. The disease must be included among the productive inflammations ; it is not a degeneration.

**Dr. Ramsburgh** said that the softness of the bones made the disease resemble rickets in this instance ; in osteitis deformans the bones may be very dense.

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Physicians and Pharmacopoeial Tests.—The active campaign of both medical men and druggists to arouse interest anew in the Pharmacopoeia is well evidenced in the program of the regular stated meeting of the Philadelphia Branch of the American Pharmaceutical Association held in the hall of the College of Physicians, N. E. Cor. Thirteenth and Locust streets, on the evening of Tuesday, November 5, 1907, at 8 o'clock. The discussion was on "The Official Standards and Tests," and included the following communications : "The U. S. P. Eighth Revision and its Relation to Some Drugs and Chemicals," by Dr. A. R. L. Dohme and Dr. Herman Engelhardt. "Comments on Some Official Standards and Tests," by Mr. L. Henry Bernegau. "Official Standards and Tests from the Standpoint of the Retail Druggist," by Mr. William L. Cliffe.

The official standards and tests virtually constitute a guaranty of purity and efficiency, for official articles, to the physician and his patients.

Physicians interested in securing for their patients pure and efficient drugs and preparations were invited to attend this meeting and take part in the proceedings.

# EASY METHODS OF CARRYING OUT THE PRINCIPLES OF ASEPTIC SURGERY.*

By ROBERT REYBURN, A. M., M. D.

Washington, D. C.

How little original thinking there generally is among mankind! This reflection is forced upon us when we consider that surgeons and physicians in general are every day, in their technique, practically violating the principles of aseptic surgery which they profess to follow.

What are some of the essential conditions which favor the growth and development of pathogenic and, in fact, of all micro-organisms? Most of these are heat, approaching the temperature of the body, and an abundant supply of moisture.

Of course it is often unsafe and practically impossible to diminish the temperature of any portion of the body much below the normal, except for a very limited period of time. What we ought to do, however, is to endeavor to cut off the supply of moisture, which is one of the essentials of pathogenic development.

Is not this elementary principle violated every day in our liberal use of so-called antiseptic solutions?

Every surgeon has seen necrosis and even gangrene produced in living tissues by the use of even dilute solutions of bichloride of mercury and carbolic acid, and the writer is glad to observe that they are becoming less and less frequently used. In his opinion the use of solutions of such corrosive agents in surgical and medical practice is utterly absurd and should be forthwith abandoned. The only solutions that should be applied to living tissues are those that imitate most closely the composition of the serum of the blood, and dilute salt solution made slightly alkaline fulfils this indication far better than any other of the so-called antiseptics. But even this solution (though comparatively harmless) should be used only when absolutely necessary, and our endeavor should be to make our operations as dry as possible and thus limit the possible growth of the bacteria and other poisonous micro-organisms.

*Read before the Medical Society, March 25, 1908.

In order to appreciate the absurdity of practical flushing of the parts operated upon in surgical cases by the liberal use of so-called antiseptic solutions, it will only be necessary in any hospital for the surgeon to examine (under a one-twelfth immersion lens) a drop of his antiseptic solution, and he will find it (if it is only a few hours old) to be loaded with living micro-organisms.

All solutions therefore that are used during or after surgical operations (for the purpose of cleanliness and removing pus and other noxious material) should be used as sparingly as possible and ought to be used only immediately after having been subjected to the temperature of boiling water.

I am glad to say that some of the recent authorities on abdominal surgery abjure the liberal flushing by normal salt solution formerly practiced after celiotomy, and suggest wiping the wounded surfaces with soft tufts of moistened cotton instead.

Nothing is more satisfactory to a surgeon of our day, in the daily round of his professional duties, than the performance of an aseptic surgical operation at one of the hospitals of our large cities. There he has trained medical assistants and nurses at his command, with an ample supply of sterilized surgical instruments and appliances, that fulfil all the requirements of the most exacting surgeon. He can leave his patient after the operation is over without a care or anxiety, knowing that every emergency will be met and that his patient will be just as well cared for during his absence as if he were present.

But a little reflection must convince every thinking mind that if all this retinue of attendants and wealth of surgical appliances is necessary for the proper performance of aseptic surgical operations, then aseptic surgery is and must be, for the great mass of the surgical operators of our vast country, merely a theoretical abstraction, and a failure as regards any practical utility to the surgeon. It should be remembered that the great bulk of surgical operations is and must be necessarily performed far from the hospitals of our great cities, and without the helps and appliances that some seem to consider so essential to success.

Consider for a moment the position of the surgeon to one of the great railroad systems stretching across some of our vast States for hundreds of miles. A collision or other accident takes place in the dead of night; he is summoned to repair instantly to the point where the maimed and wounded require his help; no

time has he to summon to his aid trained nurses, nor is he able to bring with him complicated sterilized apparatus, but he must perforce use such simple appliances as he has at hand and make them answer his purposes.

The military surgeon after an engagement, the surgeon to a large manufactory, the surgeon on duty in a mining camp, and other surgeons are engaged all over our country in numberless positions in which for obvious reasons the finer technique so elaborately insisted on, and very properly so, in our large hospitals, is entirely impracticable and impossible of execution.

Admitting, then, for the sake of argument, the condition of things above mentioned, the question arises, "Is this elaborate technique necessary, and can we not carry out the principles of aseptic surgery in simpler ways, with just as good results to our patients?"

It is my firm conviction that the elaborate techniqne insisted on by some is entirely unnecessary, and, heretical as the opinion may seem, that some portions of it are actually injurious to our patients. This remark applies more especially to the application of bichloride of mercury solutions to cut or abraded surfaces of the human body, which in the opinion of the writer of this paper should never be done.

The use of bichloride of mercury solutions should be confined to the cleansing of the skin of the patient over the seat of a surgical operation, and to the cleansing of the hands and arms of the operator.

Investigations were carried on at Johns Hopkins University (published in the *Johns Hopkins Hospital Bulletin*, of April, 1891, pp. 50-60) by Dr. A. C. Abbot, on "Corrosive Sublimate as a Disinfectant against Staphylococcus Pyogenes Aureus;" on page 59, at the close of a very elaborate series of investigations on the subject, he says: "It is seen that under the most favorable conditions a given quantity of corrosive sublimate has the property of rendering inert only a given certain number of individual organisms." *Ibid*, page 60, he summarizes his results in the following words: "In the light of these experiments and those of the experimenters quoted in this paper, it is plain that for use in surgical practice the solutions of corrosive sublimate do not possess all the advantages hitherto attributed to them. To the employment of the sublimate solutions upon wounded surfaces it is plain

there exists at least two serious objections: First, the albumen of the tissues and fluids of the body tends to diminish the strength of, or indeed renders entirely inert, the solution employed; and second, the integrity of the tissues is materially injured by solutions of this salt."

Investigations made at the University of Michigan (published in the *Medical News* of October 1 and 8, 1892) have shown that solutions of mercuric bichloride when used as a germicide are often inert, and still oftener actually injurious to the tissues, when applied during surgical operations.

Dr. Charles T. McClintock gives in the above paper, p. 399, the following summary of his experiments, viz: "1. The high rank heretofore given to corrosive sublimate as a germicide is without warrant and based on faulty experiments.

"2. The varying power of resistance in different cultures, as pointed out by Esmarch and insisted on by Gruber, is an all-important factor to be noted in determining the germicidal power of any agent.

"3. That sublimate forms with cellulose, as cloth, filter paper, etc., with silk, with albuminous bodies, with some part of bacteria (probably the envelope), a chemical compound that can not be removed by any amount of washing with water.

"Thus the sublimate, when acting upon a germ, forms a capsule around it that protects the germ for the time from the further action of the sublimate, and in turn forms an impenetrable barrier to the growth of the organism unless it be removed. This barrier may be removed with salines, and is more rapidly removed in proportion to the renewal of the salines; conditions that are fulfilled in the circulating blood."

Antiseptic surgery endeavors to destroy the micro-organisms in and around the wound and thus prevent their development. How futile this effort must be, when we consider that these organisms are everywhere and at all times present with us. They are in every breath we draw, in much of the water and in many of the articles of food that we consume, and indeed exist always in the alimentary canal and all parts of the body exposed to the air. But on the other hand, it must be remembered that there are bacteria and bacteria. There are some species of bacteria which, when planted in a wound, will cause as the result of the poisonous materials formed by them the formation of pus,

with the resulting septic fever, as certainly as the acorn when planted and nourished will develop into the sturdy oak. There are other species which when they come in contact with a wound are practically harmless. Of course, we cannot with the naked eye distinguish between the poisonous bacteria and the harmless ones, and hence our only safe plan is as far as possible to exclude them altogether from wounds, whether made by violence or those made during surgical operations.

How, then, can this be done? The first point to be observed is to use as little water or watery antiseptic solutions as possible in contact with the wounds made during surgical operations. The reason for this course is that by so doing we remove one of the essential conditions necessary for the development of bacteria, and thus prevent or at least hinder their growth. It is practically impossible to diminish or prevent the growth of bacteria in a wound by either raising or lowering the temperature of the wounded parts; hence we can only endeavor to accomplish this object by making use of the other two methods of limiting bacterial growth, viz: to keep all wounded surfaces as dry as possible, and to exclude them from the action of the atmospheric poisonous germs, during the process of repair.

Simple and self-obvious as these principles of treatment may appear to be, yet they are largely neglected and ignored by very many surgical operators at this very time. Often during an operation performed even by the most eminent surgeons (let us say an amputation) we see the field of operation deluged with various solutions.

This seems to me to be radically wrong in practice, and entirely inconsistent with the elementary principles of aseptic surgery. Of course, in operations which require the opening or removal of large suppurating cysts or cavities, it is necessary to wash them out. This should be done, we believe, with fluids as near the composition of blood serum as possible. That wonderful operator, Lawson Tait, of Birmingham, England, who completed his third thousand of operations upon the abdominal cavity, used no fluid to wash out the abdominal cavity during his operations, excepting recently-boiled water.

For use in surgical operations the following fluids only are necessary, viz: recently-boiled water used tepid (about the temperature of 100 F.) and normal salt solution (0.75 per 1000,

easily made by dissolving one ounce, avoirdupois, of common salt in a gallon of boiling water.)

Aseptic surgery, therefore, is, after all, nothing but cleanliness, but when we say that, we mean cleanliness carried to a microscopic degree of perfection, and far surpassing the ordinary ablutions by soap and water. What we endeavor to do at the present time, before any surgical operation, is to so thoroughly cleanse the patient, the surgeons, assistants, nurses, surgical appliances and dressings (of course, including the hospital and all its surroundings), that no germ of poisonous bacteria can infect the wound and cause suppurating fever, and perhaps the death of the patient operated upon. Modern surgery starts out with the assumption that in an operation aseptically performed upon an aseptic patient, and by an aseptic operator, there should be neither suppuration nor fever following any surgical operation. This is, of course, the ideal of surgery, which cannot always be realized, but nevertheless it is the goal toward which we should aim and which we should always endeavor to attain.

Every instrument and surgical appliance must be sterilized shortly before the operation, either by boiling in water containing one per cent. of carbonate of soda (commonly called washing soda) in half an ounce to three pints of water, or by being exposed to a dry heat above the temperature of boiling water (from 230 to 240 F.) for one-half hour before the operation. This can be done in the various patterns of steam and dry sterilizers which are now on the market, and can be procured at a moderate cost.

But my principal object in writing this article is to call attention to the fact that aseptic surgery can be practically carried out without the purchase of any apparatus whatever. A tin wash boiler, which can be found in the humblest home, is just as good for sterilizing surgical instruments as Arnold's or other of the steam sterilizers now in use. A still more simple sterilizer for small instruments is the ordinary oblong tin baking pan, so familiar to our eyes in our youthful days. This pan, when filled with boiling solution of carbonate of soda, may not look quite so ornamental as a porcelain evaporating dish or a forty-dollar copper sterilizer, but it will do just as good work. As before mentioned, to the above must be added absolute cleanliness of the operator, assistants, nurses, and, in fact, of all who come in contact with the patient.

One incidental and very great advantage in operating in private houses, providing they are clean and in good sanitary condition, is that the germs of poisonous bacteria are for obvious reasons not so liable to be found there as in the air of crowded hospitals. In regard to the sterilization by the dry method, the only thing that is absolutely necessary to be purchased is a good thermometer, graduated to a temperature of 300 F. Of course it is convenient, and perhaps more surgical looking, to buy a dry sterilizing apparatus, but it is by no means essential. The oven of a kitchen range or that of an ordinary cooking stove will answer every purpose. Take a common pasteboard box, such as letter envelopes are packed in, place in the bottom of it a layer of aseptic cotton about two inches in thickness, lay on this your instruments and surgical appliances (bandages, etc.), with your thermometer, and your apparatus will then be complete. Place in the oven and expose to a temperature of 230 to 240 F. This temperature can be easily regulated by a little practice, and is lower than the temperature required for ordinary baking purposes, which is said to be 270 F.

Dry sterilization of cutting instruments for surgical uses can be easily effected by passing them deliberately through the flame of an alcohol lamp or a blue gas flame. After cleansing pass them through the flame three times (avoiding overheating) and they will be found to be perfectly sterile.

The only danger is in destroying the temper of the scalpel or bistoury by overheating, but it is much better to spoil a knife than to infect a patient.

At quarantine stations where large quantities of infected clothing and other materials have to be sterilized, superheated steam is used at the temperature of 105 centigrade or 221 F. This method requires not only a steam boiler capable of furnishing superheated steam at the above temperature, but also a vacuum apparatus to be connected with the engine (to remove the air from the material to be sterilized.) This would be an ideal method for the sterilization of surgical instruments and dressings, but, unfortunately, very few surgeons have the requisite apparatus at their command.

**Dr. Stone** said that Dr. Reyburn had omitted from consideration the most important features of the problem—the aseptic preparation of the surgeon's hands and the site of operation.

While Dr. Reyburn's suggested simple appliances were to be commended where nothing better can be obtained, experience has demonstrated that the best results can be had through the use of the expensive apparatus installed in hospitals.

**Dr. Chappell,** commenting on Dr. Reyburn's advice to exclude air from wounds, inquired what effect would this procedure have upon such bacteria as the tetanus bacillus which is anaerobic and the propagation of which would be encouraged by the exclusion of air? He had always been of the opinion that wounds which might be suspected of tetanus infection should be laid wide open and kept exposed to the air. As to abstaining from the use of fluids in the treatment of wounds, what is to be done in the case of railway or other accidents where the wounds inflicted are apt to be filled with grit ground into the tissues? Surely fluids must be used in such cases and in considerable quantities.

**Dr. Kober** called attention to the fact that it has been shown that if more attention had been paid to the personal cleanliness of the surgeons there would not have been so much mortality from sepsis during the civil war. Most of the damage was done by the surgeon's fingers and probes, which busily carried infection from case to case; this was a much more potent cause of septic infection than the cold-water treatment. Bullets are much less noxious than unclean fingers; it would have been better practice to have left the bullets alone and trusted the wound to nature's occlusion dressing of blood clot. The paper, he agreed with Dr. Stone, was not complete without reference to the preparation of the surgeon's hands and the patient's skin.

**Dr. Vaughan** said that he agreed with Dr. Reyburn as to sloppy operations. Dr. Reyburn must have taken for granted the disinfection of the skin; Dr. Vaughan could not see how disinfection of the skin and surgeon's hands was possible without the use of fluids. But after the skin, hands, instruments, etc., have been made aseptic, he thought the less fluid used the better. We do not yet know everything about sepsis nor about asepsis; our successors may smile at our methods as we smile at the methods of our predecessors.

**Dr. Reyburn** said that he realized that there was much to the subject that he did not touch upon; he had not intended to present an elaborate study. His principal reason for presenting the paper was to protest against the sloppy treatment of wounds; the reason for the great success in the treatment of wounds in Cuba was the speedy application of dry dressings and then letting the patient alone. The water dressings which were used during the Civil War only served to keep the tissues macerated and relaxed and at the same time supplied the requisite moisture for the rapid propagation of bacteria. He would have wounds made dry, protected from the air, and left alone. He thought the danger of tetanus from the exclusion of air very small. He abhorred the

use of antiseptic solutions, such as corrosive sublimate and carbolic acid, upon open wounds; the only fluid used should be that approximating the blood serum—normal salt solution.

## PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

**Wednesday, March 4, 1908.**—The President, Dr. H. D. Fry, in the chair; about 95 members present.

Authority was given to have printed 200 reprints of the papers and discussion connected with the Symposium on the Causes of Typhoid Fever.

An invitation was read requesting the presence of the members of the Medical Society at the 25th anniversary meeting of the Washington Obstetrical and Gynecological Society.

Dr. Nichols read a paper upon "Acidosis." Discussed by Drs. Williams, Kober, Mackall, J. D. Morgan, Roy and J. D. Thomas. See p. 133.

Dr. Dunlop read a paper on "The differential diagnoses of chronic non-tuberculous joints." Illustrated by lantern slides. Discussed by Drs. Shands, Vaughan and Balloch. See p. 149.

**Wednesday, March 11.**—The President, Dr. Fry, in the chair; about 75 members present.

Dr. G. Tully Vaughan reported a case of stab wound of the heart, and exhibited the patient. Discussed by Drs. Balloch, J. D. Thomas, Van Rensselaer, G. W. Cook and Hasbrouck. See p. 175.

Dr. W. P. Carr presented a specimen of double uterus. Discussed by Dr. G. Brown Miller. See p. 174.

Dr. Isabel Haslup Lamb read the essay: "Some clinical studies in organotherapy." Discussed by Drs. Lochboehler, R. S. Lamb, I. S. Stone, Reyburn, Wood and Chappell. See p. 156.

Dr. D. S. Lamb read a historical sketch of "Perkins's Tractors" and exhibited a set of the instruments, with a caricature of their use (of about 1800). See p. 167.

**Wednesday, March 18.**—The President, Dr. Fry, in the chair; about 100 members present.

The Chair announced the death of Dr. Anne A. Wilson, and appointed Drs. Sophie Nordhoff-Jung, Ada R. Thomas and Emma Lutz-Erving a committee to report resolutions of respect.

Dr. J. M. T. Finney, of Baltimore, addressed the Society upon Hirschsprung's Disease, after which he was given a rising vote of thanks.

**Wednesday, March 25.**—The President, Dr. Fry, in the chair; about 50 members present.

Dr. Sofie Nordhoff-Jung, for the committee, reported resolutions of respect to the memory of Dr. Anne A. Wilson, which were adopted. Tributes to the personal qualities of Dr. Wilson were paid by Drs. I. S. Stone, Kober and Stavely.

Dr. G. W. Cook read a paper upon "Gastric ulcer." Discussed by Drs. Claytor, Vaughan, Stavely, I. S. Stone and Mackall.

Dr. Reyburn read a paper upon "Easy methods of carrying out the principles of aseptic surgery." Discussed by Drs. I. S. Stone, Kober and Vaughan. See p. 181.


# WASHINGTON MEDICAL ANNALS.

Journal of the Medical Society of the District of Columbia.

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# Editorial.

## HISTORY OF THE SOCIETY.

### SPECIAL NOTICE.

The Committee on History of the Society asks the especial attention of the members of the Society to the following statement:

The biographical sketches of the members have been provisionally made up from the data at hand, but before being edited into proper shape for printing the following opportunity is offered to each member to see these data, not only in his own case, but in that of anyone else in whom he is interested, in order that he may, if he desires, suggest alterations or corrections.

Up to the present date the number of members since the beginning of the Society is 912. The sketches are arranged in the order of accession of the members to the Society. Each name, therefore, has a serial number. During the months of May and

June, 1908, the typewritten copy of these sketches will be at the residence of the Chairman of the Committee, Dr. D. S. Lamb, 2114 18th Street, N. W., where it can be seen any day between the hours of 9 A. M. and 5 P. M.

An alphabetical list of the members will be at hand to enable the member to consult his sketch ; this list shows the serial number of the name as well as the page on which the sketch will be found.

Members desiring to make changes in their sketches will please communicate the same to the Chairman of the Committee.

A personal sketch should state at least the following facts, namely : the full name ; the day, month, year, and town and State in which born ; the year and institution in and by which degrees are granted, including, of course, that of M. D.; service in the army, navy, marine hospital or Indian service ; hospital and college connections ; and any other medical or any civic matter of interest ; and the titles and dates of books and other publications, *but not journal articles.*

Of the 912 members, some 500 photographs have been received, and half tones of these have been or will be made. Members who have not yet furnished their photographs but contemplate doing so, are reminded that this matter should be attended to at an early date. Neither the Committee nor the Society has any arrangement with any photographer ; members, therefore, are free to consult any photographer they see fit.

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The District of Columbia Retail Druggists' Association, under date April 15, 1908, through its Executive Committee, sends the following circular to the Annals :

" You are no doubt familiar with the excellent work being done by the American Medical Association in urging physicians to better serve the welfare of their patients through prescribing preparations official in the U. S. Pharmacopœia and the National Formulary ; in this work the American Pharmaceutical Association and the National Association of Retail Druggists are assisting to the best of their ability.

" It is now the purpose of the above-named association of Druggists to become interested in this work and to assist the physicians of the District of Columbia, along the lines that have been sug-

gested by the American Medical Association, in every way possible.

"You will shortly receive samples of several preparations from your nearest druggist; later this association will present you, with their compliments, an epitome of the work, giving detailed information, which we are sure will prove valuable in your practice.

"The Food and Drugs Act having adopted the U. S. Pharmacopœia and National Formulary as standards, therefore these works and the formulae contained therein are the standards recognized by the U. S. Government; consequently, they are compelled to be of known strength, composition and quality, which can always be relied upon, while those of a secret composition controlled by a single manufacturer are subject to his will or whim, and in many cases the composition thereof is constantly changing. Since the enactment of the Food and Drugs law this condition has been exposed more forcibly than heretofore, so that many preparations do not resemble what we had been previously receiving, which no doubt you have noticed.

"The preparations of the U. S. Pharmacopœia and the National Formulary can be supplied by every capable pharmacist throughout the country, and, as the above books are easily consulted, the physician is enabled to meet all conditions that may arise with preparation, or combination thereof, of known composition, strength and purity that are recognized as standards. By the intelligent use of these standard preparations, incompatibility can be avoided, which is not always the case with preparations of a secret formula.

"Much more might be said on this subject, but the foregoing will indicate what we have in mind and intend doing. We feel that you are interested in whatever will assist to bring about better conditions in the practice of medicine, and that we are entitled to and will receive your hearty co-operation."

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The Mississippi Valley Medical Association.—The thirty-fourth annual meeting will be held in Louisville, Ky., October 13, 14, 15, 1908, under the presidency of Dr. Arthur R. Elliott, of Chicago. The Address in Medicine will be delivered by Dr. George Dock, Professor of Medicine in the University of

Michigan, Ann Arbor; and the Address in Surgery by Dr. Arthur Dean Bevan, Professor of Surgery in Rush Medical College, Chicago. The local Committee of Arrangements in Louisville has selected The Seelbach hotel as headquarters; the general sessions and the section meetings being held in the hotel's large auditorium.

## Medical Miscellany.

**Medical Association of the District of Columbia.**—The regular stated meeting was held January 28, 1908. The following applicants for membership were elected:

William E. Rogers, Georgetown University, 1904; Emma M. Corey Starr, Howard University, 1904; William J. Mallory, George Washington University, 1903; James A. Gannon, Georgetown University, 1906; S. Wren Howard, Georgetown University, 1903; Richard F. Tobin, Georgetown University, 1905; Mead Moore, George Washington University, 1906; Huron W. Lawrence, George Washington University, 1903; Charles I. Griffith, Georgetown University, 1905; Arthur L. Hunt, George Washington University, 1905; Henry C. Cook, University of Louisville, 1902; Elwin C. Schneider, Georgetown University, 1905; Martha M. Lyon, Howard University, 1907; Wm. Cabell Moore, University of Virginia, 1902.

The Committee on Public Policy and Legislation reported a memorial against the passage of a bill by Congress licensing practitioners of chiropractic. The committee was directed to present the memorial to the Commissioners of the District of Columbia and to Congress. The same committee was also given general authority to act for the Association in regard to any other bills which might come up for Congressional consideration and which affect the medical profession of the District of Columbia. The committee was authorized, if it should desire, to confer with the Homeopathic Society as to action on any measures of common interest to the two bodies.

The death of Dr. Anthony M. Heger, U. S. A. (Retired), on January 25, 1908, was announced.

The resignations of Dr. E. A. Abernethy, removed to North Carolina, and Dr. H. L. Brown, U. S. Navy, were accepted.

L. H. Reichelderfer.

**Society of Ophthalmologists and Otologists.**—Meeting December 20, 1907. Dr. Monte Griffith reported the case of a woman whom he had just seen, but who many years ago was a

patient of Dr. Belt: she had had a *bullous keratitis* which was treated for nine months by puncture, curette, cautery, formalin and, finally, the actual cautery and galvanism; there had been no treatment and she had had no pain since 1899, but there was quite a scar. The other eye was now affected, and he asked for suggestions. Dr. O. A. M. McKimmie said that about eleven years ago he had a similar case and called it *keratitis nodosa;* there was a heaping up of the epithelial layers. He found it necessary to dilate the pupil. Recently he had again seen the patient, who was now over 80 years old, and her condition was about the same; the cornea resembled sandpaper, and she was gradually getting worse; she had had an acute pain, with inflammation; and one drop of euphthalmin brought on an attack of glaucoma. He thought that the predisposing cause was an eczema or an arteriosclerosis. Dr. Griffith said that a bullous keratitis was due to a lymph stasis. As to treatment, Fuchs had suggested the use of stick nitrate and normal salt.

Dr. Griffith also reported the case of a girl 15 years old who had been struck in the eye with a barrel stave in August, 1906, resulting in a very large and peculiar *staphyloma* with a thick scab that had a malignant appearance.

Dr. W. H. Fox presented a case of *chronic glaucoma* that he had presented one year previously, in order to show the result of the year's treatment. Vision in the left eye remained the same but that of the right eye had decreased from two feet to 0; strychnia one-thirtieth grain had been used.

Dr. McKimmie reported a case of suppurative dacryocystitis, and asked for suggestions as to treatment.

Dr. C. W. Richardson reported a case of a young man 17 years old whom he had just seen. Three years previously he had an *osteomyelitis* affecting the right tibia; about eight inches of the bone were resected. A blow on the right clavicle caused osteomyelytis there and the diseased bone was excised. Examination for tuberculosis was negative. The cervical glands on both sides were inflamed and were excised. In the autumn of 1907 the scar tissue broke down and a fistulous opening was formed with the trachea, and there was marked dyspnœa. The laryngeal mirror showed the vocal cords in a position half way between adduction and the cadaveric; underneath the right cord was a web formation connected with the posterior end of the cord. Breathing was quite audible. The arytenoid was scarlet red and edematous. The interesting features of the case were the fixation, the injury of the nerve, the inspiration wave of the left vocal cord and absence of any evidence of tuberculosis. The question arose whether tracheotomy should be done.

Dr. H. A. Polkinhorn reported two typical cases of the remission stage of glaucoma controlled by eserin.

Dr. Mason read a paper on *primary mastoiditis*, and reported

three cases. Dr. Bennett said that he believed that these cases were always preceded by a middle-ear infection, as in one of his own cases one year ago, which, after having apparently recovered, had a mastoid involvement, and later sinus thrombosis and meningitis. Dr. McKimmie had seen three cases in the practice of his colleagues, all of which were secondary to acute otitis media. Dr. C. W. Richardson had had a number of such cases, all of them due to antecedent infection with micro-organisms; the disease subsided in spite of mastoid changes, but later there was an exacerbation with serious complications.

Dr. Fox read a paper on *conjunctivitis* in rheumatism and rheumatoid arthritis. Dr. Wilmer said that he had seen one case with Dr. Fox, and considered the Doctor's description perfect. Dr. Wilmer had seen a number of these cases, either catarrhal or muco-purulent; none of the purulent type. Soothing solutions were indicated; stronger solutions aggravated the condition. The secretions were very tenacious and the conjunctiva much swollen. Aspirin acted better than sodium salicylate.

Meeting January 17, 1908.—Dr. Griffith recalled his case of keratitis reported at the previous meeting, and stated that he had obtained a history of floating kidney and arteriosclerosis with a blood pressure of 230; he was giving sodium nitrite and iodide. The case of the girl with staphyloma was also recalled, and he stated that the eye had been removed by retinoscopy. There was a 9.5 D of hyperopia in the remaining eye.

Dr. Polkinhorn reported a case of suppurative chloroiditis that presented somewhat the appearance shown in Dr. Griffith's case.

Dr. McKimmie reported a case of *thrombosis* of a branch of the central artery of the retina. He gave three doses, 10 grains each, and iodism was produced. Under chloride of gold and taraxicum, it had quickly disappeared. He believed that the eyes were emmetropic. Dr. W. S. Newell mentioned the case of a patient who became blind in one eye while hoeing. After treatment for one year with the iodides vision was 20/40. Dr. Griffith mentioned a case in which vision that was 20/200 was improved to 20/30. Dr. McKimmie considered anemia responsible for the cherry-red spot, the red of the choroid showing through the retina at the macula.

Dr. W. A. Wells read a paper on the various affections of the voice caused by diseased conditions, local and general.

The next meeting, Feb. 21, 1908, was clinical, and was held at the Episcopal Eye, Ear and Throat Hospital; many cases were reported and discussed.

At the meeting, March 20, 1908, cases were reported and discussed. Dr. Newell read a paper on Snake venom in ocular diseases.

Dr. J. H. Bryan reported a case of chronic otitis media, tuberculosis, suppuration and mastoid abscess, with tuberculosis of the brain.

# Reviews.

OUTLINES OF PSYCHIATRY. By WM. A. WHITE, M. D. Reprinted from *The Journal of Nervous and Mental Disease* Publishing Co. New York.

It has afforded me exceptional pleasure to read this volume of 227 pages from cover to cover; and I shall never regret the pleasant task.

Dr. White's introductory chapter will furnish food for thought to many students of psychology, and doubtless will be often referred to. Chapter II is replete with wholesome and practical views, the author's complete definition of insanity being especially worthy of commendation. The classification followed in this work would appear to be in a measure similar to that of Kraepelin, of Heidelberg, and Paton, of Baltimore, and is as follows: 1. Paranoia and Paranoid States. 2. Manic-Depressive Insanity. 3. Paresis. 4. Dementia Praecox. 5. Involutional Melancholia. 6. Senile Psychoses. 7. Infection-Exhaustion Psychoses. 8. Toxic Psychoses. 9. Psychoses Associated with Other Diseases. 10. Borderland and Episodic States. 11. Idiocy and Imbecility.

While the "Kraepelinian theory" has been the subject of much unfavorable criticism, it should be noted that some who were formerly antagonistic to his classifications are now enthusiastic supporters of them. Among the "antis" may be mentioned an authority who recently issued the fourth edition of his work. Under the heading "Maniacal-Depressive Insanity" this writer says: "Mention may be here made of the fact that some authors * * * regard mania and melancholia and the periodically recurrent circular and alternating forms of these disorders as merely manifestations of a single morbid entity, which is by them designated *maniacal-depressive* insanity. * * * In practice, however, we have to deal with cases exhibiting an attack of, to all intents and purposes, simple mania or melancholia, and in the present state of knowledge there would not appear to be sufficient justification for abandoning the older method of classification and for regarding mania and melancholia as mere phases of one disease." The same author discusses the subject of "Dementia Praecox" with comparatively few words condemnatory of the term and of its application. The writer was at one time arrayed with those who could see no real advantage in Kraepelin's clinical classification, but he has, in a measure at least, seen the error of his way. Dr. White has devoted much time and care to the chapter on "Examination of the Insane," which will be extremely useful to the student of this subject.

It is a source of much gratification to me to find that the author,

under the treatment of the Neuroses, says: "This group of cases is especially favorable for a rational psychotherapy." The writer has daily proof of the almost inestimable value of psychotherapy in the treatment of neurasthenia and hysteria.

Let us hope that within a reasonably short time Dr. White, who has such an enormous amount of clinical material at his disposal, will give us an up-to-date work on Clinical Psychiatry similar to that of Clouston, whose classifications are now obsolete.

WILLIAM L. ROBINS.

THE SANITARIUM SYSTEM AT BATTLE CREEK, MICH.—A well written and profusely illustrated booklet giving a complete description of the methods of the Battle Creek Sanitarium, has been received by the ANNALS.

As set forth in the brochure, the purpose of the institution is, 1st, to put into effective use every practical method that modern medical science has provided for the accurate determination of deviations from the normal standard of health, and, 2d, to make available every rational means of treatment known to science, giving special prominence to physiological therapeutics.

The work of this institution should recommend itself strongly to all the best men of the medical profession, not only because of its very advanced and rational methods for the treatment of disease, but also because, although not affiliated in any way with religious denominations, its character is such as to appeal to all thinking physicians, *the entire profits of the enterprise being devoted to charities.*

This work is aided by organized laboratories for various lines of research, and especially in relation to diet and nutrition. The system offers no panaceas and claims no secret methods nor processes, nor does it prescribe a routine course of baths. The application of the system requires a large corps of nurses and assistants who are trained in the technique of hydrotherapy, massage, manual and mechanical Swedish movements, medical gymnastics, electricity and thermotherapy in addition to the ordinary hospital practice. The number of persons employed is never less than 800.

After the determination of the degree of activity and efficiency of the great bodily functions, the patient is assigned to the particular one of the thirty physicians in attendance at the Sanitarium who is especially qualified to deal with the individual case. All known means are brought to bear to discover any possible organic changes in the various organs.

A tabulated report for the year ending Dec. 31, 1907, shows that besides other special examinations, there were made 2,503 chemical examinations of gastric fluids, 5,932 blood examinations for blood count and hemaglobin, 29,000 of blood pressure, 423 determinations of the opsonic index, 6,282 complete quanti-

tative urinary examinations, and 1,903 examinations of feces (bacteriological, microscopical and chemical).

The value of these examinations is greatly increased by the Sanitarium method of scientifically controlling the patient's diet before the analyses are made, and taking into account the ingested substances, as well as those resulting from tissue metabolism.

The thoroughly rational character of the physiological method and its absolute necessity in diagnosis and prescription is shown very fully by the illustrations and reports contained in the *Battle Creek Sanitarium System*. Of especial interest are the pictures and descriptions of the hydriatic and electric equipment and procedures, including the electric-light bath, salt glows, electric baths, treatments with the photophore, arc light, percutient, lateral and centrifugal vibratory treatments, etc.

It is said that "drugs are little used, for the reason that in almost every instance their resources have been quite exhausted before the patient arrives at the Sanitarium."

The head of the institution, Dr. J. H. Kellogg, has made it the policy and practice of the Sanitarium to cooperate with the home or attending physician, not to supersede nor antagonize him in any way, and in each case, where so desired, to send the attending physician a full report of diagnosis, all analyses and measures of treatment prescribed.

A copy of this brochure, *The Battle Creek Sanitarium System*, can be obtained by any physician upon request.

WILBUR M. PHELPS, M. D.

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(CHARTERED 1819 AND 1838)

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Heitmuller, Geo. H., *A. B.*, 1604 Vermont avenue.
Heller, Joseph M., The Farragut.
Henderson, George, 1234 Newton street, n. e.
Hickling, Daniel Percy, 1304 Rhode Island avenue, n. w.
Hodges, John Walter, 639 East Capitol street.
Holden, Raymond Thos., 802 6th street, s. w.
Holland, Josiah Hutton, *Phar. D.*, The Burlington.
Holmes, Mary, 227 1st street, n. e.
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Howard, S. Wren, 2705 13th street, n. w.
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Hunter, Montgomery, 2808 N street, n. w.
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Jack, William Alexander, Jr., 1423 T street, n. w.
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LeMerle, Eugene Lyman, 2011 Q street, n. w.
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Lewis, Samuel Edwin, 1418 14th street, n. w.
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Littlepage, Wm. Houston, The Alabama.
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Parker, Henry Pickering, *A. B.*, 1518 Connecticut avenue, n. w.
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Parsons, Mary Almera, 1216 H street, n. w.
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Perry, George Nelson, 1316 Q street, n. w.
Petteys, Charles Volney, 1822 12th street, n. w.
Phillips, Wm. Fowke Ravenel, 1607 16th street, n. w.

Pickford, Edward F., *A. B.*, 422 8th street, s. e.
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Shaw, John Watson, 1453 Rhode Island avenue, n. w.
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Snowden, Edgar, 1909 Q street, n. w.
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St. Clair, Francis Alphonso, *Phar. D.*, 1319 T street, n. w.
Staples, Aubrey Horatio, Riggs House.
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Steltz, Peter Henry, Jr., 611 North Carolina avenue.
Stone, Charles Granville, Brightwood, D. C.

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| Stoutenburg, John Albertson, | 116 2d street, s. e. |
| Street, Daniel Baen, | 1000 9th street, n. w. |
| Strickler, Melchior B., | 815 M street, n. w. |
| Strobel, Mary Louise, | 16 R street, n. w. |
| Stromberger, Henry Halliday, | 1810 9th street, n. w. |
| Stuart, Albert Rhett, *A. M.*, | 7 Dupont Circle. |
| Stuart, James, *A. B.*, | 1315 12th street, n. w. |
| Suddarth, James Littleton, | 817 North Capitol street. |
| Suter, Henderson, | 3026 N street, n. w. |
| Suter, Wm. Norwood, *A. B.*, | 911 16th street, n. w. |
| Sutherin, John W., | 1013 M street, n. w. |
| Syme, Wm. H., | 3009 P street, n. w. |
| Talbott, John Allan, | The Burlington. |
| Tappan, Joseph Clarence, | 11 R street, n. e. |
| Tayler-Jones, Louise, *M. S.*, | The Woodley, Columbia Road. |
| Taylor, Lewis Harvie, | The Cecil. |
| Taylor, Thomas, | 238 Massachusetts avenue, n. e. |
| Thomas, Ada Rebecca, | The Thomas. |
| Thomas, John Daniel, *A. B.*, | 1603 19th street, n. w. |
| Thompson, Edgar Dorman, *A. M.*, | 1247 North Capitol street. |
| Thompson, Joseph Ford, | 1604 19th street, n. w. |
| Thompson, J. Lawn, | 805 12th street, n. w. |
| Thompson, Millard Fillmore, *D. D. S.*, | 484 Maryland avenue, s. w. |
| Thönssen, Wm. Julius Reichman, | 315 C street, s. e. |
| Tobias, Henry Wood, *B. E.*, | 1424 Q street, n. w. |
| Toner, John Edmund, *Phar. D.*, | 214 14th street, n. e. |
| Tubman, James Richard, | 1222 11th street, n. w. |
| Tucker, Wm. Peyton, | The Kenesaw. |
| Vale, Frank Palmer, | 1737 H street, n. w. |
| Van Rensselaer, John, *A. M.*, | The Rochambeau. |
| Vaughan, George Tully, | 1718 I street, n. w. |
| Vincent, Thomas Norris, *A. M.*, | 1221 N street, n. w. |
| Wagner, Wm. F., *Phar. G.*, | 501 L street, n. w. |
| Walker, Reginald Redford, | 1710 H street, n. w. |
| Wall, Joseph Stiles, | 1232 14th street, n. w. |
| Walsh, F. C., | Canana, Sonora, Mexico. |
| Walsh, John Edgar, | 202 East Capitol street. |
| Walsh, Ralph, | The Albany. |
| Walter, William Francis, *A. M.*, | 487 H street, s. w. |
| Warren, George Walter, | 1212 H street, n. e. |
| Waters, Charles L., | Madison, near Brightwood avenue. |
| Watkins, Edgar Wm., | 2820 14th street, n. w. |
| Watkins, Samuel Evans, | The Alabama. |
| Weaver, Clarence Arlington, | 1614 Q street, n. w. |
| Wellington, John Ryder, *A. M.*, | 1706 R. I. avenue, n. w. |
| Wells, Walter Augustine, | The Rochambeau. |
| Werber, Gustavus, *A. M.*, | 1353 Q street, n. w. |
| White, Charles Stanley, | The Farragut. |
| Whitson, Wm. E., | 418 6th street, n. w. |
| Wilkinson, Oscar, | 1404 L street, n. w. |
| Wilkinson, Walter Watkins, | The Burlington. |
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| Wilmer, William Holland, | 1610 I street, n. w. |
| Winter, Eugene Chas. Curtis, *Phar. D.*, | 815 4½ street, s. w. |
| Wood, George Wm., | 2906 P street, n. w. |
| Woodward, Wm. Creighton, *LL. M.*, | 508 I street, n. w. |
| Yarnall, John Hepburn, | 3028 P street, n. w. |

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| Yarrow, Henry Crecy, | 814 17th street, n. w. |
| Yates, Frederick, *LL. M.*, | 1230 9th street, n. w. |
| Young, Wm. Glenn, | 903 M street, n. w. |

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135 Marlboro street, Boston, Mass.
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| " Jefferson R. Kean, | War Department. |
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| " Dwight Dickinson, | 1806 R street, n. w. |
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| " P. M. Rixey, Surgeon-General, | Navy Department. |
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| " L. Stejneger, | Smithsonian Institution. |
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# WASHINGTON MEDICAL ANNALS

## REVIEW OF PATHOLOGY.*

BY EDWIN B. BEHREND, A. B., M. D.,

Washington, D. C.

To attempt to review the work of the year in Pathology and Bacteriology is impracticable. An enormous amount of activity in these fields of medical research precludes anything but a most elementary and superficial survey, which would be uninteresting and unsatisfactory. For many years pathological research was confined to the collection of facts gathered first in the dead house and later added to by the refinement of microscopical investigation. These studies gave to medicine a firm foundation. The existence of particular changes in the body as the result of disease soon dissipated the vague and hazy theories extant until then. While knowledge of diseased processes was furthered in this way, it was barren of results so far as any application could be made to the alleviation of suffering. The various pathological changes studied after death represented in most instances only the terminal morphological conditions of a long series of functional disturbances.

Pathology, therefore, fell into disrepute. Recognized as important, it assumed a large part in disquisitions on medical subjects, although it was often impossible to connect, except through the imagination, the clinical phenomena and the abnormal tissue changes. These groups of facts remained for a long time isolated. While it was known that some connection must exist between them, no distinct advance was made until the rise of Bacteriology as a factor in the etiology of diseases. So great has been the progress of medical knowledge since then, which actually only

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dates back about thirty-five years, that all other causes of disease have been overshadowed in importance and, in a sense, neglected until quite recently. There are other etiological factors that must not be overlooked, such as are concerned in the constitutional diseases, gout, diabetes, obesity, rheumatism, insanity and possibly the malignant tumors.

In these diseases, where functional and nutritional disturbances are not caused by the presence in the tissues of living parasites, the advances have been much slower. This is due to the fact that our ignorance is dependent on the lack of knowledge concerning the molecular changes in the cell protoplasm. We know something of the primary and late stages of the nutritive processes; but there is a vast intermediate stage, still practically a *terra incognita*, about which we can scarcely do more than conjecture.

The ferment which has leavened the great mass of accumulated facts was the application of the experimental method in pathological study. It became possible through the refinement of bacteriological technique to investigate the infections. The causes of many were isolated. Their characteristics were discovered and carefully noted. Toxic substances, the products of their metabolic activity, were found to be the direct factors in the elucidation of the functional and morphological changes in the tissues. Insight was gained in the ways through which the protective mechanisms of the body were increased and augmented. Out of these investigations have come new fields of research. Pathological physiology and chemistry are quite overshadowing the gross and histological pathology. The pathologist of today is more concerned with the constitution of the fluids of the body than the cells. Morphology has not added much to our knowledge for some time, and, until microscopic methods are still further improved, is not likely to.

Sight, of course, is not lost sight of the fact that in the last analysis the cells are the important elements. It is probable that through altered function as expressed in the abnormal constitution of the body fluids light will be thrown upon the molecular relations in the living protoplasm. Advances have been so rapid in these investigations that there has arisen a literature bristling with new terms and a nomenclature which, to one who has not given any attention to these matters, is almost incomprehensible.

Complete as the blood mixture is, the extent of its complexity was not dreamed of until the study of the action of cellular poisons, chiefly bacterial, was reflected in it by a large number of substances which have to do in some manner with the production of immunity. The terms immune body, complement, cytolysins, aggressins, agglutinins, opsonins, precipitins, etc., will give some idea of the nature of the substances which have to do with the modern conceptions of a subject of pre-eminent importance.

It will be remembered with what enthusiasm the advent of diphtheria antitoxin was received by the medical and the lay world. The millennium of medicine was in sight, and casually it appeared as if all the infections whose causes were known were on the eve of subjugation. Investigations, however, similar to those which were so successful in solving the diphtheria problem were followed by bitter disappointment. While some success was attained, as in tetanus and a few other infections, the majority refused to give up the secret of the mechanism through which protection and immunity were to be obtained.

It has been found that to a large extent the production of immunity depends on the nature of the toxic principle. In one class of cases the poisonous action is dependent on a soluble toxin which is produced as a part of the bacterial cell metabolism and cast off; on the other hand, the toxic principle is a part of the bacterial cell body and insoluble. In the latter case the complexity of the problem is greatly increased, for the protective powers of the body have to be exerted not only in the neutralization of a comparatively simple toxin, as in diphtheria, but in the neutralization plus the dissolution of the germ itself.

Here we meet with difficulties that have not yet been surmounted. While it is perfectly possible to produce immunity against diseases of endotoxic nature, as, for instance, typhoid fever, it is impossible to use the sera of immunized animals in a curative way, which is, of course, of the greater importance, inasmuch as we have not yet arrived at the point of universal immunization against every infection; and even if we had, the immunity would likely only be temporary. The reason of our inability to use such sera lies in the fact that they contain only the antibodies in excess. These bodies have not the power of uniting directly with the bacterial cells, and require for their proper action the presence of a connecting link, substances which are present in normal sera and known as the complements.

In immune sera of this type, therefore, only one of the necessary constituents to destroy the bacteria is present. The complements are not increased by the immunizing process, and so the effect of a powerful antiserum is lost through the absence of proper binding factors. So the inefficiency of such sera as the anti-typhoid, anti-pneumococcus and anti-streptococcus is explained.

In the investigation of the bactericidal sera certain phenomena have been encountered which should be considered in the employment of such agencies in the attempt to effect a cure. While it is recommended in the use of antitoxic sera to use large doses, as in diphtheria and tetanus, such a procedure in the use of bactericidal sera may be fraught with great danger and may lead to aggravation of the disease concerned.

This caution is not entirely causeless, as there are several such sera on the market and are now being used by practitioners. Their injurious actions have been explained theoretically as due to a deviation or deflection of the complement by the excess of interbody in the bactericidal sera, whereby the combination between bacterial receptors, immunebody and complement is prevented. This, then, leaves the bacterial cell to exert its harmful influence, unaffected by even the normal protective powers of the blood. In other words, its injurious action is enhanced rather than diminished.

Somewhat differently explained is the action of the anti-meningitis serum of Flexner, which is now being tested in the treatment of epidemic cerebro-spinal meningitis. This serum, which is bacteriolytic, evidently causes a direct disintegration of the diplococci in the meninges, after the manner of the Pfeiffer phenomenon. For this reason it is probable that the intraspinal form of injection is preferable, and advised in the treatment. While the efficacy of this serum has not been definitely fixed at the present time, enough evidence has been gathered to indicate that the preliminary success will be sustained.

Since bactericidal and antitoxic sera have not fulfilled the promises expected of them, attention has been directed with great zeal to the development of vaccine therapy. This work has been greatly stimulated by the researches of Wright and his pupils on the opsonins, and the development of a treatment based on the measurement of the opsonic index. While the enthusiasm

aroused by Wright's publications has not been entirely justified and the theoretical considerations may have to be modified, vaccination, in the generic sense, has added something of considerable value to therapeutics. It is probable that the tedious and time-consuming technique of determining the opsonic index may not be an altogether necessary adjunct to the employment of the vaccines.

It must be remembered that the opsonins are but one of a number of protective substances that are found in the blood. It does not necessarily follow that an increase in one indicates an increase in all. Improvement has been noted in the clinical signs in cases where the index was not increased by the bacterial inoculations. In some instances no improvement at all has been noted, although the opsonic index was high. The last word in this matter has not been said, and further investigation is necessary to fix the status of this addition to our knowledge.

It has been in the local and circumscribed infections that the best results have been attained by vaccine therapy. General infections have been but slightly or not at all influenced by it. No proved advances have been made in the specific treatment of this class of affections, although it is possible that certain recent investigations, arising out of the study of the serum sickness, may have an important bearing on the protection against and even the cure of generalized infections of endotoxic nature.

By brilliant and painstaking research Rosenau and Anderson have discovered that the inoculation of animals with fluid and cellular substances of a foreign nature produced a condition in these animals of such a nature that a subsequent dose of the same material, after an appreciable time had elapsed, produced violent symptoms and frequently death in the affected animal. This condition they have designated hypersusceptibility. Gay and Southard, in their work on the same subject, have named it anaphylaxis, as a result of certain theoretic considerations that they have adopted. Rosenau and Anderson believe that hypersusceptibility has an important bearing on the question of immunity and represents a stage in the process of resistance to certain diseases. They feel encouraged, from their preliminary work, that the prevention and even the cure of diseases of general nature may be related to this condition.

Another subject of perennial interest is that of the tumors,

particularly the malignant varieties. The apparent increase in cancer as a cause of death has given an added stimulus to investigation. Yet, but little has been gained which might be considered a distinct advance, notwithstanding the immense amount of time and energy expended. Continued research seems to indicate that of the various theories of causation, the embryonic, or the one which seeks for the nature of the disease in the constitution of the tumor cell, has the most adherents. The parasitic view has lost ground as one experimental method after another has failed to substantiate it. Various microorganisms, bacterial and protozoan, have been described by numerous and competent pathologists. In some instances immunization has been attempted, as in Doyen's micrococcus neoformans. Therapy has not received much benefit from those who still cling to the parasitic nature of the affection.

On the other hand, if tumors are due to the lack of balance of the various vital functions of the cells of such a nature that reproduction is increased at the expense of all the others, we may seek for their destruction in the lessened vitality which is so characteristic of such inherently weak structures. This idea would seem to be supported by the results of certain methods of treatment, as arsenical pastes, x-rays, Coley's toxins, etc.

In this connection the work of Beebe and Tracy on the treatment of experimental lymphosarcoma in dogs by means of heated bacterial emulsions is of interest. The result was that the tumors underwent a regression through a process of necrosis and subsequent liquefaction and absorption. The organisms used were the bacillus prodigiosus, streptococcus pyogenes, staphylococcus pyogenes and bacillus coli communis. The destructive action on the tumor cells of the endotoxins of these organisms seems clear. The best results were attained by direct inoculation in the tumor masses, although a curative effect was also observed when the inoculations were made at a distance from the tumors. This is a fruitful field for further study.

The tumor cells, feeble and poorly nourished, are prone to early degenerative changes of a severe type which usually terminate in necrosis. The total necrosis of all the cells in a tumor would be virtually a cure, and natural spontaneous cures have been reported. Any method, therefore, by means of which we could hasten these degenerative changes is a great desideratum.

In the toxic principles from bacterial sources we have substances against which normal cells have to exert all their powers of resistance to prevent destruction. Is it not likely, then, that tumor cells, under these circumstances, would succumb and be destroyed? It would seem so from the work of Coley, Beebe and Tracy, cited above.

There is, however, an obstacle to universal success, in that tumor cells obey many of the laws of normal ones and, among others, the property of becoming immunized to these toxins. This would be indicated by those cases in which for a time inoculation seems to benefit but soon loses its efficiency, after which the tumor runs its natural course without hindrance. It is possible that by varying the toxins rapidly, a maximum of destructive action may be attained with a minimum of immunization.

The study of cancer is being furthered largely through experimental pathology and chemistry, and many interesting facts have been discovered. Crile and Beebe have found that the blood of patients suffering from malignant tumors produced hemolysis of normal blood, a condition which may have an important bearing on the operation of transfusion. This particular reaction has also a certain diagnostic value, as can readily be seen.

Interesting experiments on the transmissibility of malignant tumors in lower animals, by Loeb, have given rise to suggestive ideas concerning the constitutional influences which modify tumor development. Tumor fragments implanted in the same animal from which they were taken, developed readily into tumor masses; but when transplanted into different animals became necrotic and were destroyed. Evidently normal animals possess powers of resistance not present in diseased ones. I might go on and cite numerous other valuable researches in this connection, but of no present practicable application. It would seem that at the present time there is a great activity in the discovery of many new and important data, which must be regarded as the foundation stones for future and wider generalizations. It is an era of collection of facts in all branches of pathological activity, necessary and important before the broad general laws underlying pathological conditions can be formulated.

With natural human eagerness we desire to anticipate and hope for impossible results which our lack of insight prevents us

from attaining. This has led to disappointment and an undue spirit of skepticism.

It is, therefore, not wise to expect frequent great and epoch-making discoveries. We must be content to know that the sum of our scientific knowledge is increasing slowly, but surely, and we should cultivate a healthy optimism that the future will profit a thousand fold through the apparently unimportant small accretions which remain for the present inchoate and unrelated.

Time is not permitted to do more than sketch imperfectly the status of the immunity and tumor questions, to say nothing of the advance made in pathological metabolism, in the pathology of the ductless glands, in the study of protozoic diseases and in nervous affections, etc.

**Dr. Kinyoun** said that he was at a disadvantage in discussing the paper, as he had been so unfortunate as not to hear the entire review. He wished to commend that portion which he had heard, but he had little to add. The subject is large and excites great interest, particularly as regards serum therapy. It appeared at one time as if we were on the threshold of universal serum therapy, and great disappointment has resulted because of the very few sera for which we can claim uniformly specific action. The most notable advance in this direction is the new serum advanced by Flexner for the treatment of epidemic cerebro-spinal meningitis. About 18 months ago Wasserman also prepared an antimeningococcus serum, but Flexner's serum is distinctly superior because it contains in addition to the bacteriolytic body an antitoxic body.

The researches of Rosenau and Anderson upon the hypersusceptibility phenomena are of great moment; they will be of service in directing the way to overcoming obstacles now confronting us in the study of serum reactions. Two years ago Dr. Kinyoun was endeavoring to find a substance to meet the lethal action of toxins; he injected human blood into a horse, as others have done, and produced a decided reaction with the formation of a precipitin; the serum from this horse produced the same result in a second horse. This laboratory experiment was of casual interest, but it served to show that if to an algebraic formula, $a + b$, another quantity is added and the whole squared, for example, we finish the operation with a much more complicated quantity than the original terms.

He had not yet come to agree with Ehrlich that the time has come to abandon the study of serum therapy and turn our whole attention to biological chemistry; Dr. Kinyoun believes that under a master mind like Ehrlich's the study of serum therapy

may yet bear fruit. It must be borne in mind that in making antibacterial sera we may produce both specific and common immune bodies. Dr. Kinyoun believes that in most sera now used we have made use of common immune bodies; it is necessary to add the specific element in order to avoid deviation of the complement.

## REVIEW OF GYNECOLOGY.*

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When I was asked by the President of this Society last fall to review this subject I did not appreciate the magnitude of the task.

It is impossible to thoroughly review the literature of the subject in a paper of reasonable length, and consequently, after thinking the question over, I determined to touch only upon such subjects as were of interest to me. In consequence, I am perfectly aware that this paper will leave out numerous things of great interest to many and very briefly and incompletely treat of those selected for consideration.

The work of Leopold and Ravano upon the relation between menstruation and ovulation was of interest, and I give their conclusions somewhat in detail. Leopold and Ravano (*Archiv f. Gynaek.*, 83 Bd. Drittes Heft, 1907) in observations on numerous cases (over 300 of them ovariotomies) in the Dresden clinic, come to the following conclusions:

1. Menstruation depends upon the presence of the ovary and the sufficient development of the uterine mucosa, and not on the simple rupture of the Graafian follicle.

2. Shortly before and during the rupture of the follicle there is in the large majority of cases an increased flow of blood to the ovary. This is probably the cause why the ovulation and menstruation occur together.

3. When a ripe Graafian follicle is ruptured a corpus luteum is formed, the age of which can be told with relative certainty up to the seventh week.

*Read before the Medical Society, April 22, 1908.

4. Ovulation at times follows a periodic cycle and also occurs irregularly, but it generally falls with the periodicity of menstruation.

5. Ovulation occurs more than one-third of the time coincidently with menstruation.

6. Ovulation can occur at any time, also when there is absolutely no uterine bleeding. This fact makes it very probable that conception can take place at any time.

7. Menstruation can occur without ovulation.

8. Also in the time of senile atrophy of the ovary one can find entirely normal follicles and corpora lutea, which means that ovulation can take place after the menopause.

*Menorrhagia due to Arteriosclerosis of the Uterine Vessels.*—Considerable attention has been directed during the past year to intractable uterine hemorrhage uncontrolled by ergot and other medicines, in which the only pathological condition found to account for the hemorrhage was arteriosclerosis of the uterine arteries. Witlek explains the bleeding by the condition of the intima of the arteries which had undergone connective tissue hypertrophy. The result of uterine contractions in such a condition is simply to compress the veins and cause venous congestion, while the arteries are not affected on account of the rigidity of their walls. He says that since childbearing is a predisposing cause, the presence of arteriosclerosis should be inferred in the case of multiparae in whom no other cause for hemorrhage can be found.

Another theory which has been advanced is that the hemorrhage is due to chronic inflammatory and senile changes in the uterus, which cause an increase in its fibrous tissue and a decrease in its musculature, allowing hemorrhage by the want of contractility of the uterus. Anspach, according to Ehrenfest, has modified these theories into a third one, which may be termed the theory of the relative insufficiency of the elastic tissue. Anspach says that in these cases no anatomical lesion has as yet been demonstrated, but it will probably be found in the elastic tissue constituents in the vessel walls and the subserous and supravascular layers, and that the physiological lesion is most likely an insufficient contractile power of the uterus. Ehrenfest reports a case in which the only cause was a hysterical condition of the patient, and thinks that in certain instances the hemor-

rhage is due to a faulty innervation affecting either the vasomotor nerves of the uterus or those nerves, plexuses or centers which regulate the uterine tonus.

*Endometritis.*—One is always pleased to find an article which upholds his own views upon a disputed subject, consequently I was delighted to read an article by Hintschmann and Adler, from Schauta's clinic in Vienna, upon the subject of endometritis, which takes practically the same views which I advocated in the chapter on inflammations of the uterus in Bovée's *Practice of Gynecology*.

As is well known, heretofore every textbook upon endometritis divides the subject into: 1. Endometritis glandularis—(a) hyperplastica; (b) hypertrophica.

2. Endometritis interstitialis.

3. Combination forms.

Without going into the details of the excellent work of Hintschmann and Adler, I will give their summary in nearly a literal translation of their own words.

Their conclusions were:

1. Endometritis glandularis hypertrophica and endometritis glandularis hyperplastica have no relation to inflammation whatever. Endometritis glandularis hypertrophica does not represent any pathological changes in the uterine mucous membrane, but is simply a premenstrual condition of the normal mucosa. Endometritis glandularis hyperplastica embraces in part normal premenstrual conditions, in part variations in the number of glands within physiological bounds; there is a glandular hyperplasia of the uterine mucosa which is entirely independent of inflammation.

2. There is only one form of inflammation of the uterine mucous membrane, *i. e.*, the endometritis interstitialis. The inflammatory process acts upon the uterine mucosa analogous to inflammatory processes in other organs, that is, in the stroma. In looking at the question in this way the true teaching concerning endometritis is bereft of its artificially-given peculiarities and placed upon a pathological and anatomical basis.

The diagnosis of endometritis rests upon the detection of infiltration cells, the morphological and tinctorially well-characterized plasma cells.

*Operation for Retro-displacements.*—Much has been said and

written against ventro-suspension, ventro-fixation and vaginal fixation of the uterus and numerous other operations are advocated.

What seems to be the true status of the subject at present is as follows:

1. Ventro-fixation and vaginal fixation of the uterus should never be done in women who have not passed the menopause or in whom there is a possibility of childbirth, on account of the dystocia which will arise.

2. Ventro-suspension, where properly done, is one of the most effectual methods for correcting retro-displacements, and can give rise to dystocia only in cases where the wound is infected or where hemorrhage causes dense adhesions. These conditions should not occur and would not if proper precautions were taken. The operation should not be done when operating in the presence of infection. Never drain the abdominal wound in such cases, and do not run the risk of infecting the stitch by removing at the same time the vermiform appendix. The danger of ileus by the usual bands of adhesions is slight. The uterus is no more liable to go into retroversion after labor than any other uterus, and an efficient perineum and proper after treatment of obstetrical cases will in practically all cases prevent this.

3. The other operations have objections, and most of them have not been subjected to the test of time.

Alexander's operation is perhaps the best in cases of freely movable uteri and where there is no abnormal abdominal or pelvic condition such as adhesions, tumors, &c., but it gives rise to hernia in a certain percentage of cases, and if infection occurs the exudate which forms can give rise to dystocia or miscarriage in subsequent pregnancies. The effects of labor on the ligaments have not been properly studied. Most of the operations are open to the same objections. In the presence of infection they are liable to give rise to exudates, &c., which may cause dystocia. Many are so fanciful that the whole series of operations has almost become farcical. Shortening the utero-sacral ligaments alone is ineffectual. My work in dispensaries has shown that in some cases operated upon by some of the newer methods, the condition is not ineffectually remedied.

Hurdon has reported two cases of dystocia arising from ventro-fixation. One occurred here, and I assisted in the operation

which was done to free the fixation band. The fixation was the result of an operation done by making a crescentic band of adhesion by scarification and sutures—another of the faulty methods of doing the suspension. In both cases the patient separated the adhesions and the uterus righted itself and the dystocia was at least partially overcome.

*Ectopic Gestation, with special reference to the treatment of tubal rupture.*—Hunter Robb (*Amer. Jour. Obstet.*, July, 1907).—Robb thinks that the advice usually given, to operate as soon as the diagnosis of a rupture of a tubal pregnancy is made, is bad. In many instances an experienced surgeon cannot be obtained and the operation is done in an imperfect manner, and in many cases where the operation is done immediately the shock of the operation, added to the shock of the rupture, is fatal.

His method of treatment is as follows: "If there are signs of improvement in the patient's condition (and this, in our experience, always takes place) we keep the patient under further observation. The change for the better is brought about by carefully stimulating the patient by means of saline infusions under the breasts and, in some instances also, by means of hot saline enemata. If the patient is not vomiting and is not nauseated, we administer a stimulant in small quantities by the mouth. Give morphine, external heat, lower end bed elevation; sulph. strych., grs. 1/10 to 1/20, every half hour or so. Have the operating room in readiness so it can be used at a moment's notice."

*Ovariotomies in Pregnancy* (Dr. M. Graefe in Halle).—The mortality in the last 215 reported cases, .47 per cent. Prognosis better than simple ovariotomy, perhaps because very few of the tumors are large and few are malignant; in either case the woman not being apt to conceive.

He says that of cases not operated upon, in 17 per cent. there is finally an interruption of pregnancy, while in 25.5 per cent. there is a miscarriage after operation; that in one-third of operated cases the indications for operation were absolute, and that in a number of cases which miscarry after operation would, without it, make operation indicated in every case of pregnancy with ovarian tumor.

In 23 cases where a double ovariotomy was performed there were 17 per cent. miscarriages.

The method depends upon the case; small, simple cysts in early months of pregnancy can generally be gotten at *per vaginam* and there is less disturbance in a general way after operation. Later in pregnancy and in dermoid cysts and solid tumors the abdominal way is preferred.

James F. Baldwin (*Amer. Jour. Obstet.*, Nov., 1907) describes an ingenious operation devised by himself for the formation of an artificial vagina in cases of congenital or acquired absence of that organ. He proposes to utilize a portion of the sigmoid flexure of the colon or a loop of the ileum for this purpose, and, in the case upon which the operation was actually performed, the ileum was used. The steps of the operation are the following: (1.) Making an artificial vagina by dissection from below until the cervix is exposed and the abdominal cavity is invaded behind the uterus. (2.) Opening the abdomen and catching with a clamp inserted from below a loop of bowel and pulling it down until the lower end of the loop is flush with the skin of the perineum. (3.) Cutting off the upper ends of the loop, leaving the mesentery of it intact, so as to insure a good blood supply, and anastomosing the cut ends of the divided gut. (4.) Attaching one upper end of the loop around the cervix uteri and closing the other end. (5.) Opening the loop below and attaching the edges to the skin of the perineum. (6.) The double vagina which would result is made into one canal by pressure clamp at the end of ten days to two weeks.

The operation is, to say the least, ingenious, and, in the hands of a skillful operator, could probably be successfully performed in a large percentage of cases. It would probably be safer to remove the Fallopian tubes to prevent the occurrence of pregnancy, as this might give rise to difficulties.

Engström reports an interesting case where a large hematocele was found in Douglas' cul-de-sac, in which the diagnosis of extrauterine pregnancy had been made. The blood mass filled the posterior part of the small pelvis. Minute macroscopical and microscopical examination failed to reveal any evidence of an ectopic gestation and indicated that the blood came from a ruptured Graafian follicle. This case was of especial interest to me, as I have recently seen a case where my diagnosis was the same as that of Engström. The patient did not come to operation, but the history and examination pointed to this condition.

Riebold reports cases of septic menstrual fever in which he found in the blood staphylococcus pyogenes aureus. He believes it an acute infection.

J. D. Morgan reports cases of menstrual arthritis.

Jaffe gives five cases (four autopsy reports and one an operation) in which the diagnosis was general peritonitis, arising during the menstrual period, and presumably caused by the invasion of bacteria through the uterus.

The theory that bacteria can invade the normal uterus during the menstrual period from the vagina is doubtless erroneous. The gonococcus is practically the only microorganism which has the faculty of invading unaided the cavity of a normal uterus.

Dr. Franz Cohen, working in Pfannenstiel's clinic in Giessen, has reported the results of his work on the etiology and therapy of pelvic inflammatory exudates. He says that in the treatment of purulent diseases of the pelvis there has been a change from the extremely radical era instituted largely by the French to a more conservative therapy. As we have learned to separate the confessedly uncertain general classification of pelvic suppurations into suppurations of the uterine adnexa, intraperitoneal exudates, and suppurations of the pelvic connective tissue, so also have we learned that differences in treatment are necessary.

In the chronic adnexa suppurations one has held fast to a radical procedure, generally a complete removal of the diseased parts, with the leaving behind of sound ovarian tissue when possible.

In freshly-inflamed adnexa and intraperitoneal and pelvic connective tissue suppurations conservative measures have given excellent results.

In Pfannenstiel's clinic, where the observations recorded by Cohen were carried out, especial pains were taken to make an exact diagnosis of the exudate.

In cases where the abscess was inside the tubes and generally of gonorrhoeal origin the incision and drainage were not carried out, but later, when the process had reached a chronic stage, he undertook a radical abdominal operation.

On the other hand, in cases of intraperitoneal or pelvic connective tissue exudates, which through the temperature curve and the general disturbance of the condition of the patient made the collection of virulent pus probable, they strove right early to

make an exact diagnosis, and by evacuating the pus to prevent a further spread of the infection.

As an invaluable diagnostic means they used the exploratory aspiration.

In 58 cases of exudates in the pelvic peritoneum and pelvic connective tissue, the incision method was considered necessary 35 times. In 28 of these cases they used the aspiration, followed in each case by the incision and drainage. Only once did the aspiration fail to indicate the nature of the exudate.

In cases where, through palpation, it was impossible to differentiate between a retro-uterine exudate and hematocele, where the history and irregular bleeding led to error, the aspiration gave the true diagnosis.

Every precaution was taken to prevent contamination through aspiration, and an exact bacteriological investigation was made through slides, cultures, and animal inoculations.

He separates the cases into two groups, (1) the puerperal, (2) the nonpuerperal.

In the 17 puerperal cases an exact bacteriological investigation was carried out in only nine cases. In six the streptococcus ; in one (four months after a feverish puerperium) the pneumococcus was found ; in one, after a year's standing, dead cocci, mostly staphylococci were found, and one was sterile.

In the non-puerperal exudates the picture was different. In most of these cases puerperal infection was ruled out. In 12 an exact bacteriological examination was made. One was sterile, five showed the coccus group, and six, various forms of bacilli. One of the coccus groups proved to be streptococcus. The patient, 2½ months before, had had a curettage, and a pessary had been placed for retroversion. Then in seven cases of streptococcus infections the bacteria had been conveyed in from the outside. One case was a pneumococcus infection in a child of ten years who had sore throat followed by a pelvic abscess probably caused by an appendicitis. Two cases were due to the staphylococcus, arising, one from appendix, the other paravesical ; fifth, gonococcus. The bacilli found varied.

His work confirms my belief, given in articles written in 1899 and 1901, that one should make an exact diagnosis where possible in pelvic exudates, especially the retroperitoneal. Most of the puerperal are due to the streptococcus, and where the peritoneal cavity is invaded in such cases the mortality is very great.

"*Wichtige Fragen zur Sterilitatslehre*"—Ludwig Pincus (Danzig), (*Archiv f. Gynaek.*, 1907, 82 Bd., p. 188).

Hammerschlag, in a previous article, asks two questions:

1. Should one treat women for sterility without first investigating the husband as to his sterility or impotence?

2. What should be one's conduct as to imparting the information obtained by examination?

Pincus cites 397 cases of primary sterility reported by Schenk, in 110 of which (46.4 per cent.) the man was investigated and the sterility was due to the sterility of the man; in 14 cases the man had rendered the wife sterile by giving her gonorrhea while he remained virile; making 59.1 per cent. in which the sterility was, directly or indirectly, due to the man.

Pincus' own statistics—488 cases of sterility: (a.) Cases directly due to the man, 119 = 24.4 per cent., indirectly, 77 = 15.8 per cent.; man responsible in 196 cases = 40 per cent.

(b.) Due directly to the woman, on account of tumors, inflammation, etc., 71 cases = 14.5 per cent.

(c.) Developmental, constitutional, etc., 221 = 45.5 per cent.; due to women, 292 = 60 per cent.

As to the questions of Hammerschlag:

1st. The answer should be "No."

2d. Pincus thinks that one should, after the most careful examination of both parties, act according to individual circumstances. One's duty is to tell truthfully to both parties the result of his examination, and he should hold out a ray of hope. He mentions a case of Fenger's where the man had azoospermia, in which Fenger told him that spermatozoa occasionally were present, in which the wife became pregnant and the man fondly believed himself to be the father. Tragedies have come about by telling the man that he was sterile while the wife was not told. Suicides have also resulted from telling the patient the exact truth.

His conclusions are that we should tell both parties the truth, acting with the greatest tact and after every scientific means has been taken to cure the sterility.

Articles on sterility by Reynolds and others have also appeared and are interesting.

*Acquired diverticulum.*—The significance of the acquired diverticula of the colon, especially the sigmoid flexure, has been

brought recently to our notice by articles by Beer, Sampson, Brewer, Mayo and others. The condition has been known for many years, but it certainly attracted little attention until articles by the authors mentioned showed it to be a not very infrequent cause of left-sided abdominal abscesses of obscure origin. Inflammatory exudates and abscesses in connection with the sigmoid flexure have usually been regarded as due to a perforation of the bowel caused by the presence of a malignant growth in the intestine or tuberculosis, and many are undoubtedly due to these conditions, but we should constantly bear in mind the possibility of a diverticulitis in considering the etiology and prognosis in such cases.

*Chorioepithelioma.*—An unusually large number of cases of this affection have been reported within the past year, and one is forced to the conclusion, from reading the description of the histological findings and the clinical histories of these cases, that many of them are not true cases of the malignant chorioepithelioma first reported by Sänger. It is not unusual to find a placental polyp, and many cases of deported chorionic villi are reported which have not proved fatal. The cases of supposed metastases in the lungs, as shown by the pulmonary hemorrhage and other signs, and which have not proved fatal, are probably cases of this kind and not true cases of malignant chorioepithelioma. Schmorl says that small metastatic foci from a malignant chorioepithelioma cannot be differentiated microscopically from chorioepithelial embolism found in vesicular mole. The difficulties encountered in making a diagnosis from histological examination have caused Schmauch to lay more stress upon the symptomatology and less upon the microscopical examination of excised or curetted material.

*Carcinoma of the uterus.*—The Germans are doing a great work in getting exact statistics as to the results of operations for carcinoma of the uterus. In order to get these statistics they require the reporters of cases to give the total number of cases of carcinoma of the uterus seen, the number operated upon, the position of the growth in the body or cervix of the uterus, the microscopical examination of the tissue, the exact method of operation, whether by the vaginal or abdominal route, whether glands removed or not, the immediate mortality, and to keep a record of the cases for a period of years, showing the percentage of recur-

rences after one, two, three, four, five, six and seven years. By this means they expect to determine the value of the various methods of operation, which cases should be deemed operable and which not, and to educate the profession and laity as to the value of early diagnosis and operation. We would do well to follow their example.

Franz V. Neugebauer (*Archiv f. Gynaek.*, 1907, Bd. 82) gives a third communication upon the subject of foreign bodies accidentally left in the abdominal cavity and wounds at operations. In this article Neugebauer reports 40 new cases, making a total number collected by him of 236 instances of this accident. In the great majority of the cases gauze compresses were the articles left behind. Artery forceps formed a considerable proportion of the bodies, while sponges, drainage tubes, one finger ring, and one pair of spectacles have all been reported as left in the abdominal cavity at operation.

In most of the reported cases the surgeon escaped suits for damages, but in a certain number of instances suits were brought, and in at least one instance damages were awarded. In a discussion upon the subject Schauta said: "For us surgeons every suit is equivalent to a conviction, because such an accusation openly discredits us. In the eyes of the public we are condemned even where the courts acquit us, and it behooves us to see to it that no such suits are instituted."

Dollinger left an artery clamp in the abdomen after the removal of a sarcoma of the ovary. Two and a half years after it was removed and the woman died. He says that in spite of the fact that the courts were satisfied with his written explanation and that he did not have to stand a trial, for 13 months he was so worried by the newspaper articles, etc., and lost so much practice, that the actual damage done him was incalculable.

Neugebauer gives the expression of opinion of various surgeons as to what is the best way to avoid these suits, etc. One way is a written agreement before the operation, signed by the patient, her husband, father, or responsible party, and with two witnesses, giving the surgeon permission to do what he deems necessary for the relief of the patient and not holding him responsible for accidents when reasonable precautions are taken. Also measures to prevent the occurrence of accidents by means of tape on compresses, counting instruments before and after operations, etc., are given.

It may be interesting to note that the ruling in the courts of America has been consistently as follows: that when the surgeon has taken the usual precautions and is of average fitness he should not be held responsible for such accidents.

*Tuberculosis of the bladder.*—Several very able articles have been written during the past year upon this subject, especially one by George Walker, in the *Annals of Surgery*. Walker gives in full the history, pathology, etiology, complications, symptomatology, diagnostic data, differential diagnosis, prognosis and treatment. To those interested in genito-urinary work the pathology of bladder tuberculosis as given by him will be of special interest. He divides it somewhat arbitrarily, as he says, into four stages; 1. The period of invasion and the formation of tubercles. 2. The period of superficial ulceration. 3. The period of deeper infiltration. 4. The period of more widespread destruction.

In giving the pathology of these stages he gives the appearance of each as would be seen by cystoscopic examination, and it quite agrees with some cases which I have had the opportunity of observing over considerable periods of time.

In the treatment he gives the very many methods advocated. In summing up the remarks on treatment he says: "Irrigations of all kinds are useless and most of them are harmful. Instillations of all the stronger drugs are contraindicated. Iodoform in some cases may be of value. Remove, when possible, the focus of bladder infection, and send the patient where he can live out of doors and where he will receive the proper quantities of well-selected food. Surgical and medical treatment other than this has played a pitiful rôle."

Wright (*Lancet*, 1905, vol. 2, p. 1676) advocates the treatment of tuberculous cystitis and nephritis by the use of small doses of Koch's lymph. He uses very small doses, from 1/2400 to 1/800 milligram at ten days' interval, and reported marked improvement in three cases. Rosenfeld (*Ann. des. mal. des. org. g. u.*, Paris, 1905, vol. 23, p. 234) also reports a case of tuberculosis of one kidney and both testicles which was apparently cured by its use. Garceau (*Amer. Jour. Obstet.*, September, 1907, p. 298) recommends its use. In cases of tuberculosis of both kidneys or of the bladder, uncomplicated by a secondary infection, one will find as favorable a condition as can be had for testing the efficiency of the tuberculin treatment. The results are given by

Walker in 433 cases, most of which are taken from the literature. In these cases there were deaths, 161 ; improved, 130 ; not improved, 77 ; cured, 29 ; made worse, 6 ; indefinite, 44.

**Dr. I. S. Stone** thanked Dr. Miller for the paper, and commented upon Dr. Miller's remarks upon menorrhagia due to localized arterio-sclerosis. Many gynecologists have had the experience of cutting open a uterus removed for cancer only to find no trace of the disease, but instead, upon the cut surface might be seen the cut ends of arteries standing above the surface as much as one mm. In a uterus thus diseased, with no chorio-epithelioma, no endometritis, nor any other inflammatory disease, hemorrhage may frequently occur and may be excited by very slight injury. Pathologists do not seem to have found a cause for this localized vascular degeneration.

Dr. Stone had looked up the after history of 750 cases of ventro-suspension done in Washington, and had found two cases of dystochia. In one case (Dr. Fry's) in which Caesarean section was done the dystochia was not due to the suspension but to infection and secondary fixation of the uterus. Dr. Stone has abandoned the operation ; he prefers the ligament operations. He maintained that in many cases of retroversion there is also an entero-ptosis ; in such instances ligament operations are not sufficient. Shortening the mesentery would cure retroversions of this sort, but how may shortening of the mesentery be accomplished ?

With regard to the operation for ruptured ectopic pregnancy, he called attention to Simpson's thesis upon that subject. Dr. Stone thought that Robb's position might do good in one respect: it might give the general practitioner some hope of the patient's recovery if surgical aid were not available. But in general he thought that surgeons would be slow to give up the notion that bleeding must be stopped at once. He has always been inclined to get these patients to the hospital at once, to open the abdomen and at least put on a clamp ; no shock, or, at any rate, no additional shock need be produced thereby,

**Dr. Sprigg** had been impressed with the remarks upon localized arterio-sclerosis in the uterus. The fact that arterio-sclerosis may be present in any internal organ without appearing elsewhere is a fact not sufficiently well recognized. The sclerosis of the vessels may be confined to the heart, liver, spleen or any other one organ or group of organs. One of his own patients, in whom there was no evidenee of general arterio-sclerosis, died of angina pectoris ; the coronary arteries were found to be hard and sclerotic. He had seen a specimen in which the splenic artery was atheromatous—no sclerosis elsewhere. So in the uterus, if the curette does not bring away any evidence of other disease, arterio-sclerosis should be suspected. These patients

bleed most profusely and occasionally die. The treatment should be vaginal hysterectomy.

Ventro-suspension is an operation he had often done and had never regretted it. Four of his cases have since given birth to children—one mother, to three children. There had been no dystochia in any of these cases. Fixation of the uterus is, of course, unjustifiable in child-bearing women; and suspension should never be done in the presence of infection. With regard to the prevention of retrodisplacements, he believes that the omission of the obstetrical binder is of benefit. If the binder is discarded, the woman allowed to turn on her side, the uterus drops forward during involution and is more apt to remain in its normal place.

**Dr. Hagner** was interested in the remarks upon tuberculosis of the bladder and kidney. There is absolutely only one hope of cure in these cases, and that is early diagnosis; for this purpose the use of the cystoscope and ureteral catheter is essential. The consensus of opinion is that genito-urinary tuberculosis always begins in one kidney, rarely is the ureter infected and the bladder infection is always secondary to the renal. The one hope of cure is to remove the infected kidney; if the bladder infection is not far advanced, removal of the kidney will allow the bladder infection to heal; thus may be seen the importance of early diagnosis. There have been three cases of bladder tuberculosis in Washington which have been cured by nephrectomy. The tuberculin treatment of bladder tuberculosis is fairly satisfactory; he observed cases under this treatment in Europe, and while they are kept comfortable by continued treatment, there are no complete cures.

His attention was also attracted by the reference to male sterility as a cause of unfruitful marriages. Gonorrhea is the usual cause of sterility among males; 40 per cent. of sterile males are rendered so by double gonorrheal epididymitis. This condition is now curable by means of anastomosis of the vas and epididymis after the manner of Martin. The stenosis is usually to be found in the globus minor; by making an anastomosis between the vas and the globus major a cure may be effected. He has effectually cured one case in this manner.

**Dr. Miller** wished it understood that the review did not express altogether his own views upon the matters presented; he had merely selected from the literature such features as had been of special interest to himself. He had been gratified by the discussion that the review had evoked.

# POST-OPERATIVE MECHANICAL ILEUS.*

By I. S. STONE, M. D.,

Washington, D. C.

Synopsis.—A brief consideration of the causes, prevention and treatment of mechanical ileus. The preliminary treatment of the intestinal canal and its relation to shock. Ileus due to trauma and evisceration. The prevention of fixed adhesions. Return of the viscera to normal position before closing the abdomen. How to prevent angulation of the duodenum, the transverse colon and the sigmoid. The importance of rest for the intestines after coeliotomy. Report of cases and suggestions regarding after-treatment.

We are accustomed to divide this subject into mechanical and adynamic ileus as suggested by Miculicz, but for the present we must content ourselves with the consideration of the former, primarily for the want of time, and, further, because we have never seen a fatal case of the latter in our own practice. We have seen two cases in consultation in which the autopsy appeared to show no cause for the intestinal paresis which had proved fatal. We further think that fewer cases will be seen in the future as we learn to investigate the cause of the disease. The present paper is not intended to take up this subject in the classic manner of many of our predecessors in this inviting field, but rather to show from our experience that it is possible to avoid much of the anxiety regarding ileus which was formerly shared by nearly all who attempted abdominal surgery.

*Causes*—Excessive depletion by purgation, which directly favors shock. Prolonged evisceration and unnecessary handling of viscera. Narrowing the lumen of the intestine, directly or indirectly, by angulation, volvulus or by circumscribed peritonitis. Unsuspected causes, such as diverticula, or adhesive bands, or congenital or acquired stenosis. In the German Surgical Congress of 1903, Kraske called attention to the dangers of the Trendelenburg position, claiming that he had two fatal cases follow its use, and he also knew that Schauta had lost two from the same cause. Heidenheim has also had a similar experience, having had one fatal result. Pasteau has lost one case, in which he

*Read before the Medical Society, April 15, 1908.

opened the bladder through an abdominal incision, with the patient in the high pelvic position, but it is possible that he did not look for the pelvic omental adhesions which permitted the fatal volvulus. All these results were preventable, and could have been avoided if care had been exercised in the replacement of the viscera. (See Pasteau, *Bull. et Mém. de la Soc. Anat. de Paris*, 1905.) Finally, we have learned that acute infectious diseases, such as pneumonia, may cause acute dilatation of the stomach, with angulation of the duodenum and hence bowel obstruction, to which we shall call attention later on.

*Means of prevention.*—First among preventive measures is to conserve the strength of the patient. We believe this should apply to the mental as well as the physical condition. In the preliminary treatment we endeavor to simplify the usual proceedings. It is wise to bring the patient to the operating room in the best possible condition, hence we think the less purgation the better. We can think of no excuse or reason for more than emptying the intestines of excessive collections of gas and fecal matters. Castor oil administered on the morning of the day previous to the operation appears to be the ideal agent for our purpose. If an emergency case demands immediate operation, it must indeed be an exception that an enema is not all that is required. We never permit hypercatharsis under any circumstances in our surgical work, and would rather operate upon a patient without purgation than with the abuse of it which we have so often seen and confess to have practiced. We believe that the former practice of giving calomel and saline purgation was deleterious and to be condemned. We never permit patients to be disturbed during the hours intended for sleep. Patients who appear to be ill enough to require frequent administration of stimulants of any kind during the hours between 9 in the evening and 6 in the morning, might do better if operation were done without waiting for the morning.*

The relation of shock to ileus is evidently one of close and intimate connection. When we discuss the avoidance of shock during operation we necessarily must consider the personal equation of the operator, if only to say that we cannot permit our-

* One of our most successful surgical results was obtained in a case of dilatation of the stomach in which gastro-enterostomy was done upon a patient who had long been starving and who had vomited repeatedly for several days prior to the operation, and whose intestines had not been emptied for an indefinite period of time. She could not retain the purgatives, and the bowels were impacted.

selves to say all that we might about those who have a method different from our own. The importance of asepsis, and of prevention of exposure of the viscera, we must consider as settled. These precautions are known and probably practiced by nearly every surgeon to the best of his ability. And yet, with this admission and this belief well established everywhere, we occasionally see the most shocking abuse of an important aid to treatment of certain conditions within the abdomen, namely, when evisceration is unnecessarily prolonged. Even if the intestines are well covered with hot towels when outside the abdomen, it must be remembered that they are in an unnatural position. The mesentery is drawn upon, and there is generally compression of both intestine and mesentery. In cases of peritonitis from appendicitis, as well as in many or all of the pelvic operations, it is possible to avoid evisceration, and it is well known that the cases of shock and ileus are frequently a result of this practice. In military surgery it is, of course, frequently necessary to remove the viscera from the abdomen while searching for and treating injuries of the bowel, but in civil life it ought to be a *dernier ressort.*

## THE FORMATION OF ADHESIONS AND THEIR RELATION TO BOWEL OBSTRUCTION.

The prevention of adhesions is one of the most important of all measures to insure against ileus. First of all, let us discriminate between the several kinds of adhesions. The coils of bowel left outside the abdomen for the time required to complete the usual abdominal section will always become adherent, even when they have been carefully covered with sponges or towels. But we have no fear about these adhesions, as they always disappear and the peritoneum remains perfectly smooth and the epithelium normal. When the peritoneum is denuded of its epithelium and its secretory glands destroyed, either by traumatism or sepsis, another result may be seen. It is our opinion that the most active and important factor in the establishment of peristalsis is the excretion of serum between peritoneal surfaces and especially between adherent surfaces. It is probable that two exposed muscular surfaces when brought into contact at any point within the abdominal cavity will unite firmly and that peristalsis cannot always, if ever, succeed in preventing

such results; therefore it is our duty to protect the patient against these dangers by careful inspection and treatment of all injured peritoneal surfaces. We advise against leaving any exposed muscular surface upon either bowel or uterus, believing that all such points inevitably result in fixed points of adhesion to some other adjoining surface, which may happen to be the intestine. In practice we frequently use the omentum in covering some raw surface. It is important to do this advisedly in order to prevent the excessive traction which has now become a relative danger from displacement of the transverse colon downwards, called the "V-shaped transverse colon."

We believe every one uses the sigmoid to cover exposed uterine muscle as we use the uterus to aid in strengthening a weak and possibly infected portion of sigmoid. Occasionally we find it necessary to attach the exposed muscular surface of the caecum to some safe spot where it may adhere safely for at least a short time during the danger period after operation. It is better to take these comparatively minor matters seriously and to anticipate results which experience has proved of importance in the final outcome of operative work.

*Replacement of the viscera.*—It may be assumed that the viscera lie very nearly as placed when returned to the abdomen, or after being adjusted when the operative work within the peritoneal cavity is completed and before the wound is closed. Vomiting does, however, influence the position of both omentum and intestines, especially in a downward direction. We believe that change of position also has its influence, although to a limited extent. This does not prevent the adjustment of certain portions of the intestinal canal where they should remain in order to perform their function with the least effort of peristalsis, and where any defect may prove incapable of harm. Having in view the danger of ileus from angulation at certain points, we think best to try to place the sigmoid and the transverse colon in positions favorable to their physiological action. To this end we frequently draw the sigmoid upward out of the pelvis and attach it above the pelvic brim to the abdominal wall, using a catgut suture for the temporary fixation or suspension. One of our fatal cases of ileus was due to misplaced sigmoid, and another, to be reported later, might have been fatal but for a second operation. Moynihan tells of another similar case (see *Abdominal Operations*, 1st

ed., p. 410). Injuries to the sigmoid are often seen, but it must be a rare event that resection is necessary when we can easily cover most of the perforations in pus cases by using the uterus or the broad ligament for that purpose. We have occasionally used both of these in covering weak places in the sigmoid to prevent rupture and the formation of adhesions.

We have recently operated upon a patient with the transverse colon in the "V" position, and, although she did not have fever or obstruction after operation, she did have a good deal of intestinal and stomach distress. The operation was to remove a small fibroid tumor of the uterus which had developed four years after a myomectomy. The transverse colon was fixed to the uterus and the omentum was nearly all sacrificed in its removal. We endeavored to restore the colon to its normal position, but did not suture it in the upper abdomen (as suggested by Mayo), much to our regret. In this case it was easy to recognize the displacement of the two flexures of the colon. Both were drawn downward and toward the median line, and perhaps this explains why the patient had not developed ileus from acute angulation. The gradual change in position permitted the bowels to act, even if with an effort. We again suggest that we must avoid undue traction upon the omentum when replacing the viscera, and we fear that the stomatologists of the future will have a harvest of cases of displaced viscera to treat, thanks to the adherent omentum found in so many relaparotomies.

*Acute dilatation of the stomach and angulation of the duodenum.*— This subject already has a literature of its own. Fagge wrote of it in Guy's Hospital Reports in 1872–73. Later, Albrecht (*Virchow's Arch.*, Bd. CLVI) reported a case after a breast operation. In *Bull and von Bergmann's Surgery*, 1st ed., p. 226, may be seen an illustration of a case of acute dilatation of the stomach associated with pneumonia. In this illustration, as in all such cases, the stomach is immensely enlarged, and fills the entire abdomen. The lower third of the stomach is pushed strongly to the right, which necessarily angulates the duodenum at or near the duodeno-jejunal fold or mesentery. The German authors take great pains to describe the pathology of this condition, and they call attention to the difference seen in the fluid found in the stomach according to the site of the obstruction. In other words, if the obstruction is above the opening for the

common and pancreatic ducts there will be little or possibly no bile or pancreatic juice found in the stomach. Several authors call this occlusion of the duodenum "arterio-mesenterialen Darmverschluss," and we fail to see why they consider the artery, rather than the mesentery itself, the cause of the obstruction. We must waive special mention of the treatment of this condition, which may be avoided in most cases by stomach-washing with the tube. Some writers suggest placing such patients in the knee-elbow position, and Kehr and others propose gastro-enterostomy.

*Treatment.*—As outlined above, we think preventive rather than operative treatment of ileus the most satisfactory. We further believe that chemical irritants applied to the alimentary canal do not produce a physiological peristalsis, and it is quite within the bounds of probability that ileus is favored rather than avoided by the early resort to purgation. Many operators have changed their former views regarding the "after treatment," and we predict many more will soon do so. In his very interesting paper of last year at Atlantic City, Frederic told of waiting eleven days for one of his patients to have a movement of the bowels after a laparotomy. He was finally rewarded, and the patient also triumphed, having won without an enema or purgative of any kind. This patient, as Frederic said, was not suffering, and he was determined to wait until she "acted upon her own initiative." Our patients occasionally leave the hospital without having taken a purgative after coeliotomy. Some of them have vomiting from the anesthetic, but few have to do so after a dose of purgative medicine, which may be said was the rule in former days. We occasionally use eserine when the first or second enema fails to act. When these simple measures fail we stop everything by the stomach, for the simple reason that nausea surely sets in, and vomiting will probably follow, unless this is done. It appears worse than useless to give purgatives under such circumstances. After a suitable length of time the persuasive method from below is again tried, and always has succeeded unless there was a positive mechanical obstruction.

It is clearly a mistaken idea that peristalsis is the one desideratum immediately after operation. Nature intended the repose she gives the intestines after exposure to air and possibly other interference. After the normal restoration of peristalsis has be-

gun it is a rule that enemas give satisfactory relief. In our review of notes of abdominal sections covering a period of time from 1893 to 1908, we have had six fatal cases of mechanical ileus. All of these were in Columbia Hospital, save one. Since 1900 we have had one fatal case and one case with second operation and recovery. Prior to 1900 we had, 1894, two cases, April and June. 1896 1 case, March. (Mason.*) 1897, 1 case. Private hospital. 1899, 1 case, June. (Prentiss.*)

Since 1900: 1905, 1 case, November. (We do not remember having had any case of ileus, fatal or otherwise, at any other hospital.)

In the early days of our surgery fully ten per cent. of our cases had some difficulty in retaining medicines (generally calomel and salts). Of this number about one-half gave a degree of anxiety lest obstruction should occur. Since the change in treatment began, it is the exception to see noticeable distension of the abdomen or other evidence of impending ileus.

The following notes of a case of ileus will serve to illustrate our method of treatment. Mrs. S., white, aged 48, entered Columbia Hospital Oct. 8, 1907. She gave a history of uterine carcinoma, and the uterus was found undergoing extensive malignant changes. Supravaginal panhysterectomy was performed after the "Wertheim method." The operation lasted a little over two hours. Numerous enlarged glands were found in the parametrium and along the course of the vessels. The patient was in the high pelvis position nearly all the time, or until we were ready to close the abdomen. Rubber tube drainage (no gauze packing). The patient required subcutaneous administration of saline solution but not venous infusion. We neglected to pay as careful attention as usual to the replacement of the viscera. On the second day after operation the resident surgeon reported an irritability of the rectum, and that only a comparatively small amount of fluid could be retained in the bowel. Vomiting had not been urgent, but the stomach tube was used to relieve the severe nausea and a large quantity of fluid was discharged. This showed a partial obstruction at or near the pylorus. The use of alum enemas and the hypodermic use of eserine in doses of 1/40 of a grain failed to afford relief or cause the discharge of gas from the bowel. At the urgent request of the resident surgeon we

* Resident physician.

permitted the administration of 1½ oz. of castor oil the same day. This remained in the stomach for 1¾ days, when some of it returned when the tube was used prior to the second operation. On the fifth day we opened the wound and found angulation of the sigmoid. It was drawn upward and a curved bulb-pointed tube introduced into the rectum until it reached above the pelvic brim. Large quantities of gas were discharged, and we closed the wound with confidence that recovery would follow. Her bowels easily responded to eserine aided by the enemas usually given, and later on by a dose of castor oil, again urged by the interne, who appeared to have unlimited confidence in its power for good.

*Brief report of all my fatal cases of ileus.*—It will be observed that in each some mechanical cause existed, and that we had no loss from so-called dynamic or adynamic ileus.*

Case 1.—C. M. Operation for pyosalpingitis, April 2, 1894. Purgatives freely administered. Bowels refused to respond to enemas and wound was reopened. A loop of ileum was attached to an infected uterine cornu.†

Case 2.—A. R., colored. Operation for pyosalpingitis, June 6, 1894. Bowel obstruction soon after operation, which purgation failed to overcome. Autopsy revealed a stenosis of the ileum which Dr. Walter Reed thought probably of congenital origin, as it was not inflammatory. The patient also had bilateral desquamative nephritis.

Case 3.—M. J., colored. Intestinal obstruction three days after hysteromyomectomy, performed June 3, 1899. Autopsy revealed an obstruction at the caecum, due to a long-adherent appendix. This patient had "fatty liver and kidneys."

Case 4, March 3, 1896.—Mrs. T., colored. Myomectomy and suspension of the uterus. Obstruction caused death on seventh day. A loop of bowel had escaped through the space between two silkworn gut sutures and was caught and firmly held by muscle and fascia until found after death when the dressings were removed.

Case 5.—M. G., colored. Operation Nov. 4, 1905, for pyosal-

*At my request, my friend, Dr. Hume, house surgeon of Columbia Hospital, has carefully collected all of the fatal cases of ileus which have occurred in my service in that hospital since 1893.

†At this time we were using figure-of-eight silk ligatures in all operations such as salpingoöphorectomy. We at once abandoned the method for excision of the cornu and stump, and used catgut instead of silk. (See report of cases in *Trans. Am. Med. Assn., Sect. Dis. Women*, 1894.) We were the pioneer in this matter of technique.

pingitis. No immediate alarm was felt in this case and the patient did well for perhaps two weeks, when ileus gradually developed. The abdomen was again opened and the cause proved to be an adherent loop of ileum securely fastened in the pelvis upon the floor of the cul-de-sac of Douglass. Death was not long delayed and nothing was accomplished by the operation.

Case 6.—Private Hospital. Mrs. —— ——, 1897. Myomectomy for three large sub-peritoneal fibroids, the patient being pregnant at the fifth month. Death from ileus on the ninth day. A loop of ileum had been caught by the sigmoid, which was strongly diverted from its normal position, and wedged in and held, along with the ileum, between the uterus and the pelvic brim.

**Dr. Randolph Winslow,** of Baltimore, was gratified to hear Dr. Stone's paper and take part in the proceedings. The term post-operative ileus means simply obstruction of the bowel occurring after an operation ; it should not be applied to any condition other than that directly due to an operation. Obstructions following operation do not differ from those spontaneously acquired ; they have the same symptoms and treatment. This difference, however, exists : post-operative ileus is more serious ; the patient may be ill already, there may be an unhealed, open wound or a suppurating wound to add to the difficulties. Ileus may come on at any time after operation—hours, days, months. Pseudo-ileus occurs early ; it is accompanied by alarming vomiting, flatulence, coprostasis, etc. It is apt to excite apprehension of true obstruction, but it is due to handling the intestines and is spontaneously curable. The outlook is favorable if purgatives are not given ; the treatment is to wash out the stomach and intestine. This is not the condition described by Dr. Stone.

Post-operative ileus may occur at any portion of the bowel : duodenum, duodeno-jejunal fold and sigmoid are points of suspicion, and obstructions at these points are receiving especial attention. Ileus at the duodeno-jejunal fold is especially apt to occur after operations upon the gall-passages. [He cited a case which recovered under stomach washing.]

The classification of post-operative ileus is unsatisfactory ; no two surgeons will unite on common grounds. Dynamic and adynamic ileus are terms used with varying significance : clinically they constitute what may be called reflex ileus. He had seen one case of this kind in a young man who had had an operation for kidney stone ; there were persistent signs of ileus, to such an extent that the abdomen was opened ; nothing was found but distended bowel. This patient died. This is not an isolated case. Dr. Winslow believes that kidney operations are particu-

larly apt to cause reflex ileus—often with fatal results. Strangulation ileus is that kind due to a band, fissure or constricting ring interfering with circulation. Obturation ileus: here there is merely obstruction to the fecal movement without interference with the mesenteric circulation. This variety is not so serious. Mechanical ileus should be the term used when the obstruction is due to some extraneous mechanical constriction; in this variety both fecal and mesenteric circulation may be cut off, as in hernia. From a clinical standpoint we may speak of septic ileus; usually due to septic peritonitis, causing paralysis of the bowel. This variety is less remediable than the mechanical.

He differed from Dr. Stone as to the most frequent cause of mechanical post-operative ileus. It was natural that Dr. Stone, being a gynecologist, should think that hysterectomy is most often causative; Dr. Winslow's experience would indicate that most cases of this sort follow appendicitis with operation, due to the acute inflammatory nature of the disease with the natural frequency of adhesive inflammation so productive of bands, slits, etc. Among other causes of ileus must be mentioned meteorism in conjunction with adhesions; normal fecal circulation may go on for a time, when with a sudden accumulation of gas, with some change of position, a kink occurs. Washing the stomach and bowel, with frequent postural change, may effect a cure, or an operation may become necessary.

One other cause of ileus should be mentioned, viz: unprotected gauze in the abdominal cavity. This practice, simple gauze drainage, has happily about been abandoned; the gauze, if used at all, should be enclosed in tissue or tubes. A similar causative factor is the leaving of raw surfaces of intestine or contiguous inflamed peritoneal surfaces; the lesson is that all raw surfaces should be covered before closing the abdomen. Certain peritonea seem to have a peculiar liability to adhere in spite of every effort to avoid the accident. Cicatricial contraction after strangulated hernia is not an infrequent cause. [He referred to a case of the sort.]

Peritonitis is one of the most frequent and dreadful of the causes of ileus. He has an idea that the postural (Fowler) treatment of peritonitis if persisted in too long, by the descensus of the bowel, may cause ileus. Another factor in the use of the Fowler position is the employment of large drainage tubes; the bowel may become incarcerated in the tube. One such case had happened in his practice; the incarceration was liberated and the patient recovered. In another case, in which a large fenestrated rubber tube was used, the bowel became incarcerated in a lateral fenestrum; the bowel was liberated in this case also, but the patient died. His conclusion was that Fowler's position should not be maintained longer than 48 hours, and that multiple small tubes, without lateral fenestra, should be employed instead of the single large tube.

In the treatment of ileus, first wash out the stomach ; if not sure of the condition present, an attempt to empty the bowel by irrigation with solutions of vinegar or alum with the use of eserine is allowable. If sure of the condition, prompt operation is the indication. Searching for the cause of ileus is not always an easy thing ; with an incision through the rectus, either right or left, first look at the caecum ; if the caecum is collapsed the obstruction is in the small intestine, if it is ballooned the trouble is in the large intestine. Sometimes it is necessary practically to eviscerate the abdomen to find the ileus. After finding the obstruction, bands should be divided, incarcerations liberated and adhesions separated *if not too great ;* if too large it is sometimes best to perform an anastomosis and sidetrack the adhesion. Fortunately resection may usually be avoided.

**Dr. Vaughan** said that he agreed with the essayist and with Dr. Winslow in most points. Dr. Winslow had referred to the difficulty in getting unanimity of opinion upon the nomenclature of ileus ; Dr. Vaughan disagreed with the accepted use of the terms adynamic and dynamic ileus. Adynamic ileus, as he understood it, is due to lack of force ; this is the most common form, and may be called pseudo-post-operative ileus ; it is always due to inflammation or reaction to injury at operation, and usually recovers spontaneously. Dynamic ileus is different ; it is ileus with force, and there are not many such cases, as he understood it. He had seen a few cases in the literature. This form is due to violent contraction of the circular muscular fibers until the bowel is closed ; the cause is probably nervous. He has seen one case which approximated this condition ; the primary trouble was strangulated hernia, but he found a space of bowel outside the strangulation so contracted as to prevent the passage of water.

Mechanical ileus should include all obstructions due to bands, adhesions, slits, impaction, intussusception and acute dilatation of the stomach. The last named condition Rokitansky described some years ago, but it did not receive general notice until a short time since ; many cases are now reported in the current literature. In one collection of 217 cases, 63 per cent. died. The cause is difficult to make out ; it has been attributed to the anesthetic, to handling the intestine, and to the dropping of the intestines into the pelvis with consequent traction upon the duodenum. Necropsies do not bear out the last named theory. There must be a nervous cause ; this idea is supported in some measure by experimental work.

Post-operative ileus from bands and adhesions, according to his experience, most frequently follows appendicitis. Most of his cases of pseudo-post-operative ileus have recovered ; such cases are the cause of great anxiety to the surgeon. [Dr. Vaughan cited two cases of post-operative ileus with unusual features of interest.]

**Dr. Taylor** had enjoyed the paper and discussion. He agreed with Dr. Vaughan that the great majority of cases of post-operative ileus are due to bowel paresis. He believed Dr. Stone was very near the truth as to the cause of this paresis, viz : the violent preliminary purgation sometimes practiced ; the bowel becomes exhausted after such intense stimulation. Dr. Stone had mentioned two valuable means of securing bowel movement after operation—eserine salicylate and alum enemata. Dr. Taylor had at first been disappointed with the first named drug, but had learned to give larger doses with great success. The alum enemata aid the eserine to a great degree, and are far superior to the old enmata of magnesium sulphate, milk of asafoetida, etc.

Dr. Taylor mentioned a case of abdominal section for the freeing of adhesions following an appendix operation ; the patient began to vomit large quantities of brown fluid and had enormous distention over the gastric area. This patient was cured by the use of eserine salicylate and stomach washing. He has since come to the conclusion that this was a case of acute dilatation of the stomach.

**Dr. Hooe** believed that the principal cause of ileus is too much handling of the bowel ; the reason ileus is less frequent at this time is because surgeons have learned to handle the abdominal contents less roughly and to close the operation more rapidly. Another reason is the care with which raw surfaces are covered. One point in the paper he was sorry to hear—Dr. Stone had rather discouraged the use of the Trendelenburg position. Dr. Hooe had come to depend upon the position and thought that it protected the bowel rather than worked any injury.

**Dr. Balloch** said that everybody understands how mechanical ileus occurs ; he was interested in the kind which sometimes happens after kidney operations in which the abdomen has not been invaded at all. This variety he believed to be due to intestinal paralysis, and probably excited by traction upon the mesentery ; any operation that allows of stretching the mesentery, with irritation of the nerves traversing that structure, will bring about this variety of ileus.

**Dr. J. Taber Johnson** was interested in the prevention of post-operative ileus. Gladstone said that education should be begun before birth ; so also, there would be no post-partal hemorrhage if the third stage of labor were properly handled, and there should be no post-operative ileus if proper care were exercised in the operation. He congratulated Dr. Stone upon his advocacy of a minimum amount of handling of the intestines during laparotomy. Dr. Stone put forward a rather paradoxical argument, however, in urging the replacement of the intestines in nice anatomical order, especially since Cannon and Murphy have demonstrated that paralytic ileus is in direct proportion to the amount of handling. Many cases of post-operative ileus are due

to finicky operating; many are avoided by covering raw surfaces. Deaver has summed up the situation by saying: "Ileus is prevented by neater technic and by getting into the abdomen quickly, doing the operation quickly and getting out quickly."

**Dr. Stone** had enjoyed and profited by the discussion. As to his remarks about the use of Trendelenburg's position, he himself had had no bad results from it, but he had seen such mentioned in the literature. From the fact that his six fatal cases of post-operative ileus were all demonstated to be due to different causes, he felt that he had not been to blame for them; the complications were unavoidable and not to be foreseen. In reply to Dr. Taber Johnson's criticism Dr. Stone said that it was a fad with him to replace the bowel in correct anatomical position, and he felt that it did no harm as the reposition could be secured with very little handling.

## THE CATALYTIC ACTION OF LIPASE IN RELATION TO ACIDOSIS.*

By P. S. ROY, M. D.,

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No subject in physiology has received more attention in recent years than the digestive ferments, and yet there is no agreement today as to their chemical structure. Some authorities are of the opinion that enzyme actions are not due to definite material substances, but are forms of energy like heat and electricity. How beautifully a master in these two forces might explain by their combined action the physiology of digestion. It is generally accepted that no pure preparation of any of the enzymes has been obtained by the chemist.

The action of the digestive ferment upon food stuffs is called catalytic, which means that they produce change by their presence without undergoing any change themselves. The first great catalytic change that occurs to foodstuffs in the presence of the digestive ferments is hydrolysis, which is a chemical union of the foods with water. This suggests to me an ion action, and I wish briefly to quote from Rutherford concerning the size, nature and action of ions. The ion is the smallest mass yet known to science. It is only known as a source of energy when in rapid motion,

*Read before the Medical Society, April 22, 1908.

having an apparent mass of about $\frac{1}{1000}$ of the mass of hydrogen. The negative ion has its greatest activity in the presence of water vapor, in other words, in the presence of hydrogen and oxygen, the two gases in the presence of which the digestive ferments commence their chemical activity. Rutherford says we must suppose that the process of ionization in gases consists in the removal of a negative corpuscle or electron from the molecule of the gas. At atmospheric pressure this corpuscle immediately becomes the center of an aggregation of molecules which move with it and is a negative ion. These clusters of molecules travel and are kept in position around the charged nucleus by electrical forces. The clusters consist of about thirty molecules of gas. After the removal of the negative ion the molecule retains a positive charge and probably also becomes the center of a cluster of new molecules. This certainly, if not correct, is a more tangible explanation of the action of ferments than the perfectly meaningless word catalytic.

The hydrolysis of the foods by the ferments is exceedingly interesting. The proteids take up water in the presence of pepsin and trypsin and become peptones, later amino acids, other acids and more complex chemical compounds. Starch by hydrolysis becomes maltose, disaccharides by the addition of two molecules of water become monosaccharides, each molecule of neutral fat by the catalytic action of lipase combines with three molecules of water and splits into a fatty acid and glycerine (an alcohol). A certain per cent. of fat passes from the alimentary canal into the circulation by ameboid movements, and still another quantity by osmosis, but much the larger portion of fat is split by lipase into glycerine and the corresponding fatty acid, and in this split condition enters the epithelial cells of the intestinal wall and the lymphatic circulation. While lipase is the so-called catalytic agent that splits the fats, bile, in a mechanical way, plays an essential part in the digestion of fats. It has been shown that when bile is absent from the intestinal tract at least one-half less fat is absorbed. The digestive function of the bile in relation to fat is that of a vehicle suspending and dissolving the fat, fatty acids and fat-splitting ferment and then aiding their absorption by the epithelial cells, the bile being the carrier of the fatty acids. It is only after fatty acids and glycerine have entered the epithelial cells and lymph spaces and have, by the

reversible action of lipase, again combined to make fat, that the bile is relieved from its duty and returned to the liver to be again sent to the alimentary canal. Lipase, like the other two great ferments, pepsin and amylase, is found outside of the intestinal tract in the tissues of the body, but lipase is found more abundantly than the others, and in every tissue of the body. This would at once suggest that its catalytic action is needed in every part of the body, which I believe to be true.

In alimentary intoxication fat is the offending article of food—neither in the child or adult can improvement be obtained until fat is withdrawn from the food. Now, we find in these cases the acetone bodies and sugar in the urine oftener than any other pathological condition. The sugar has been supposed to be due to the absorption of lactose, which in itself would suggest a faulty action of the lactose in the pancreatic juice. May not there also be a faulty action of the lipase of the pancreatic juice, permitting, by the failure of the reversible action of lipase in the epithelial cells, the split products of fat, glycerine and the fatty acids to enter the circulation? The glycerine could well account for the sugar in the urine in alimentary intoxication, although the absorption of lactose may be the source of the glycosuria. The fatty acids seem to be oxidized with difficulty in the system, and if at any time lipase fails to act at the very threshold of metabolism and permits the fatty acids to pass from the epithelial cells to the circulation, I can see no reason and can find none in the theories of acidosis why the sudden pouring of fatty acids into the system may not be the forerunner of acidosis, for what is acidosis but an imperfect destruction of the fatty acids?

If after the fats have been deposited in the tissues carbohydrates are withheld from the diet, as in the treatment of diabetes, the system turns to the stored-up fats for energy, and they are split by lipase faster than the fatty acids can be oxidized; then again we have a condition causing acidosis, and the reason carbohydrate diet cures the starvation acidosis of Von Noorden is that it replaces the fats needed by the system for energy and restores the metabolism of fats to a normal basis. Knoop tells the clinical worker what can happen in the system to convert the fatty acids into the acetone bodies, but he does not tell why the fatty acids are in excess in the circulation, or what are the intracellular processes that produce that over-abundance. Magnus-

Levy believes that oxybutyric acid is formed in the liver by autolysis. Is it not that the oxybutyric acid is formed in the liver as well as in the other tissues of the body from the fatty acids that are formed by tissue autolysis through the action of lipase? If the views of Benedict are confirmed by future investigation the whole literature of acidosis must be rewritten. Benedict says that even in the great excess of acid in diabetes the blood is neutral, the hydrogen ions constantly approaching normal. With the light that is with us it seems very probable that the digestive ferments, particularly hydrolysis, play an important rôle in the faulty fat metabolism we call acidosis. It must be kept well in mind that lipase not only splits fats, but by reversible action combines glycerine and the fatty acids into fats, which are stored for the needs of the system.

**Dr. Wall** said that those who have encountered cases of acidosis would appreciate the value of papers like that presented by Dr. Roy. He had suggested an interesting hypothesis in explanation of the genesis of acidosis, but had not made clear why lipase, a ferment distributed throughout the body, should alone be responsible. The fatty acids are highly complex bodies, they are difficult to oxidize, and it would seem more reasonable to blame acidosis for their faulty destruction than their overproduction. The consensus of opinion is that the fatty acids are responsible for the condition. Any attempt to clarify an obscure question such as this is to be commended, and he congratulated Dr. Roy upon the ingenious theory advanced.

**Dr. Roy** emphasized the point made in his paper, that acidosis is brought about by too slow oxidation of fatty acids, but also that the fatty acids are supplied for oxidation too fast by the fat-splitting activity of the lipase. Acetone may, perhaps, be a normal ingredient of the blood and urine, but oxybutyric and diacetic acids are certainly not.

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Doctors as Business Men.—"Doctors are not business men," is a remark that is getting to be wearisome, both because it is repeated so often and because it is true. That doctors are not business men is because they have not been taught that the practice of medicine is both a business and a profession. But they ought to be taught, and by those whom they pay to teach them.—*Jr. A. M. A.*

# THE SYNCYTIUM, ITS FUNCTIONS AND ITS RELATIONS TO THE TOXEMIA OF PREGNANCY AND TO CANCER; PROBABILITY OF A PRIMAL OR UNIVERSAL ANTITOXIN.*

By GEORGE W. WOOD, M. D.,

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Recent studies of the syncytium remove the placenta from the realm of casual observation and make it worthy of the closest investigation and profoundest study.

The syncytium, in the developed placenta, is a double layer of nucleated cells covering the villi of the chorion and, according to Peters and Minot, is of fetal origin, being formed from the primitive ectoderm and mesoderm or trophoblast.

"When the impregnated ovum falls into the uterus it sends out numerous prolongations which soon fix the egg in its position and draw nourishment from the thickened uterine mucous membrane. This cell wall with its villus-like projections constitutes the false chorion, which soon disappears and is replaced by the single layer of the blastodermic membrane and surrounding the whole ovum. This membrane, in its turn, throws out branch-like processes (the villi of the chorion) which, at first non-vascular but hollow, soon receive into the interior of each branch of the villi, loops of the blood vessels that have been carried from the fetus to the periphery of the egg by the allantois. These vascular villi cover the whole embryo and dip into the decidua reflexa until the third month, when they atrophy and finally disappear, except at that portion of the ovum where it is in direct contact with the decidua vera, where the chorion will develop to form the placenta. Here the villi take on an extraordinary growth, forming buds of epithelial cells which compose the syncytium" (Hirst's Obstetrics).

"It—the syncytium—appears at the end of the first week as an irregular layer of nucleated protoplasm covering the ovum." (Heisler's Embryology).

When the syncytium is developed, it is a double layer of cells without cell walls, and covers the villi of the chorion. Like all

* Read before the Medical Society, May 6, 1908.

embryonic tissue it has the power to proliferate; and it grows by indirect division known as mitosis or karyokinesis.

The villi of the fecundated ovum have, from the first, an erosive or digestive action which enables the ovum to adhere to the uterine mucosa. This digestive action continues in the syncytial cells; for they continue to proliferate and penetrate the uterine surface, paving the way for new vascular loops of the placenta and covering them after they are formed. This growth and activity of syncytial tissue continues to the later months of pregnancy and perhaps to the end of gestation.

"*Normal Function or Physiology.*—1, Ovum enters by the syncytium; 2, acts as gland and filter; 3, carrier of nourishment; 4, placental secretions act through syncytium; 5, acts as enzymes; 6, acts as true blood gland; 7, normal deportation of chorionic villi.

"The syncytium furnishes a means of entrance for the ovum into the uterine mucosa, the maternal element being destroyed by the histologic properties of the syncytium. * * * As the plasmodium of the syncytium is not divided into cells regularly, the exchange of material between fetus and parent is thereby facilitated, this tissue acting as a filter as well as a glandular organ.

"Another feature of the syncytium is to pass along the products of fetal life into the maternal circulation; it also acts on the maternal blood, carrying nourishment from it to the fetus. The syncytium modifies the substances which pass from mother to child, playing the part of the enzymes.

"That the placenta possesses an internal secretion is a matter which does not admit of doubt; it has been demonstrated that a protolytic sub-ferment exists in this secretion. The chemical composition of this ferment is not known; some investigators think that there may be fat, lactic or glycogen ferments; at any rate the internal secretion of the placenta acts through the syncytium; this secretion may act on the fetus through the whole of pregnancy. Some authors believe that this secretion produces many of the phenomena of pregnancy, such as vomiting and chloasma.

"Veit has written of the normal deportation of villi or parts of villi together with their syncytial covering; he has proved that they may be carried to the most remote parts of the anat-

omy, and yet the general or cytolytic equilibrium of Nature may remain undisturbed. Whether this has any bearing on the normal function of the villi is not known as yet; in these cases this material is either absorbed or it remains unmolested and unmolesting in so far as the contiguous tissues are concerned. Hence, this metastasis might be termed a normal or physiologic function." ("The Syncytium," Laura House Branson, *Journal A. M. A.*, Sept. 28, 1907.)

Peters believes that syncytial cells are formed from the trophoblast, but are modified by the secretion from the maternal blood. (Heisler's Embryology.)

Since the formation of toxins by the fetus is constant, and the presence of disease or other conditions detrimental to the fetus are only occasionally found in the mother, this theory would seem true; otherwise we should have here an organism evolving a protection for another greater than that which it makes for itself, an anomaly practically unknown in nature. Colles' Immunity, where a mother may suckle her syphilitic babe without acquiring the disease, illustrates such a protective action.

*Pathology.*—The syncytium by physical and chemical defects may cause hydatidiform mole, syncytioma malignum or chorioepithelioma and the toxemias of pregnancy. "It may cause sterility by failing to make a suitable nidus in the decidua in which the ovum may lodge. By degeneration it may cause abortion after the placenta has formed. By its persistence after childbirth it may cause subinvolution." ("Syncytioma Malignum," McFarland, *Amer. Jour. Obstet.*, XLIV, 469.)

Metastasis may or may not cause pathological conditions. Syncytial tissue in the blood is not necessarily poisonous, but it may find lodgment somewhere and later become malignant growths.

Teratomas often contain syncytial tissue, but they are of presyncytial origin, being derived from cells of the early blastodermic layer of the ovum. These embryonic cells having found suitable lodgment may remain dormant for an indefinite time; later, when the resistance of their host is lessened, they, like all embryonic tissue, may proliferate and in an incoherent way attempt to complete their life cycle, evolving syncytial, placental and the more differentiated tissues of the developed body, often containing bones, teeth, hair and muscle fiber, besides curious tubular formations supposed to be segments of intestines and

other organs. Teratomas are not derived from nor related to syncytioma malignum, as they are evolved from different embryonic tissues.

A very excellent description of hydatidiform mole and of syncytioma malignum can be found in the paper on "The Syncytium" by Laura House Branson, in the *Journal A. M. A.*, Sept. 28, 1907. About fifty per cent. of hydatidiform mole is followed by syncytioma malignum, which is usually fatal. In the latter disease the syncytial cells push past the decidua serotina and invade the uterine muscularis.

*Toxemia of Pregnancy.*—Under this may be classed "morning sickness" or the simple vomiting of pregnancy, pernicious vomiting, albuminuria, eclampsia, puerperal mania and acute yellow atrophy of the liver.

There are many theories as to the causation of these phenomena such as (a) pressure of the uterus on the renal veins as a cause of albuminuria; (b) secretions of the corpus luteum; (c) secretions of the ovary; (d) absorption from the intestines; (e) hepatoxemia (Pinard and Bouffe de St. Blaise); (f) invasion of the maternal organism by fetal elements, the syncytio-toxin theory of Veit, Boehme and others; (g) its identity with eclampsia on the one hand and with acute yellow atrophy of the liver on the other (Charpentier de Rives and Bouffe de St. Blaise, Stone, Ewing and Edgar, *Prog. Med.*, Sept., 1905, p. 196).

Kaltenbach believes pernicious vomiting to be due to hysteria (*Prog. Med.*, Sept., 1905, p. 192). Blumenreid thinks eclampsia due to a "specific irritability" of the general nervous system during pregnancy (*Prog. Med.*, Sept., 1905, p. 206). Trommer thinks the parathyroids may have something to do with eclampsia (*Prog. Med.*, Sept., 1907, p. 150). Leipman believes in a placental toxin (*Prog. Med.*, Sept., 1906, p. 159). The great majority of writers, however, believe these phenomena are due to a toxin or toxins circulating in the maternal system.

The toxemia of pregnancy is now defined as "a functional disturbance of the liver attended by severe anatomical lesions of the organ and, secondarily, functional and anatomical disturbances in the kidneys and other organs" (*Prog. Med.*, Sept., 1905, p. 211). With the termination of labor the symptoms usually subside.

"*Theories of Toxins.*—After the growth and formation of the

placenta, when the embryo becomes the fetus, the blood of the mother generates in the serum antibodies which antagonize the invasion of syncytial tissue ; the presence of syncytial elements in the blood determines the formation of a special cytotoxin, in this instance called syncytio-toxin.

"Ehrlich's side-chain theory is the foundation for the following : An organism has the power to produce anticells or antibodies which have the power to prevent excessive proliferation of these fetal cells or chorionic elements, and thus to keep a cytolytic equilibrium.

"In this case the toxin and the body antagonizing this on the maternal side is designated anti-syncytio-toxin. This anti-syncytio-toxin has the power to dissolve or render inert any syncytial tissue in excessive proliferation. * * * It has been proved beyond a doubt that the villi are carried by the blood. Veit and Opitz believe that the syncytium covering these villi is dissolved in the maternal blood, producing syncytio-toxin ; normally this is counteracted by the antibodies or anti-syncytio-toxin produced by the blood."*

A careful perusal of the literature on the toxemia of pregnancy shows that there are really but two great causes : (1) where there is a defect either in the structure or function of the syncytium, and (2) where there is an excess of the syncytial cells or syncytial enzymes present in the maternal system. Both of these conditions may exist in one individual at the same time. Under the first division come "morning sickness," albuminuria and eclampsia ; under the second, are pernicious vomiting and acute yellow atrophy of the liver.

In the albuminuria of pregnancy the placenta is generally found in a state of marked degeneration ; poorly adherent to the uterus and, indeed, often separating with the onset of labor, thus simulating placenta praevia by its presentation and profuse hemorrhage. Examination shows the veins dilated into large sinuses and areas of fibrosis where the placenta had ceased to be of functional use. This condition is probably produced by the contracted capillaries or the high blood pressure of the mother.

Dienst, by injecting milk into the artery or vein of the placentas of a number (365) of eclamptic patients, found the fluid escaped from the large sinuses on the maternal surfaces. In the

*Branson. *loc. cit.*

placentas of normal patients this but seldom occurred. (*Prog. Med.*, Sept., 1906, p. 107.) This patulous condition of the placenta would allow of a free escape of the waste products of the fetus into the blood of the mother; hence there is produced a condition identical with that of deficient renal function. Eliminative treatment and restricted diet, such as is used in nephritis, usually cause a cessation of the albuminuria and sometimes of the eclampsia.

With the death of the fetus, both albuminuria and eclampsia usually cease, showing that they are due to fetal metabolism. (*Prog. Med.*, Sept., 1905, p. 206.)

Morning sickness may sometimes be due to other causes than fetal metabolism, but the fact that its disappearance is usually coincident with the formation of the placenta strongly suggests a fetal toxin as its chief etiologic factor.

Pernicious vomiting and acute yellow atrophy of the liver are so often associated together as to strongly suggest a common cause. Post mortem findings often show syncytial cells present. In these conditions the liver is always primarily affected and its lesions much more extensive than those of the kidneys, where the effect is secondary. *Acute yellow atrophy of the liver in pregnancy, I believe, is due primarily and directly to the digestive action of the syncytial enzymes on the parenchyma of the liver.*

The digestive power of the fecundated ovum is very great. Instances are recorded where ova only a few days old—one as young as eight days—have eaten through the Fallopian tubes, causing hemorrhage and symptoms of collapse. (*Prog. Med.*, Sept., 1906, p. 173.) This digestive power seems to be imparted with full energy to the syncytium; for it pushes its way into the uterine surface vigorously and proliferates rapidly; and where such active elements are liberated into the blood in any number, it would seem reasonable to suppose that they would have a marked cytolytic effect on the corpuscles and various organs, creating toxins which impair the organic functions.

The question naturally suggests itself, Why should the liver be so greatly affected when it is so peculiarly protected from syncytial metastasis? It is because of its structure and function. Its parenchyma, compared to its fibrous structure, is much greater than that of any other organ. Its lobules are held together by the most delicate fibrous network, just enough to separate one

lobule from another. Its circulatory system is unique, for it is the only organ that is nourished almost entirely by venous blood. The venaporta receives all the venous blood from the spleen, stomach and intestines; and, compared with this, the amount received from the hepatic artery is relatively small.

The blood which the liver receives from all of the digestive tract is rich in nutrition and poor in cytolytic elements, so that the main source of attack from syncytial enzymes is through the hepatic artery, although it is possible some may come through the capillaries that nourish the organs of digestion. This hepatic artery enters the liver with the portal vein, follows its entire course, and anastomoses with its capillaries on the periphery of the lobules.

It has been shown that in the presence of bile the amylolytic and proteolytic power of the pancreatic juices is doubled, while that of the fat-splitting element is trebled ("Recent Advances in the Physiology of Digestion," E. H. Starling, p. 116). Since the syncytial enzymes act in an alkaline medium they probably resemble the pancreatic ferments.

It is a significant fact that in acute yellow atrophy of the liver the periphery of the lobules is usually first affected. The enzymes of the syncytial cells, liberated in the blood stream by the cytolytic action of that fluid, enter the liver by the hepatic artery, and there first come in contact with the lobules at their periphery. Here, mingling with the bile in these cells, their action is intensified, and the necrosis of the liver begins. Outside of the digestive tract, there is no other place than the liver in which this commingling of bile, in any appreciable quantity, with enzymes could occur.

Some of the cyncytial cells, or buds of them, enter the liver undissolved. Finding there cells so rich in glycogen and so feeble in resistance, they probably take on renewed activity and proliferate indefinitely.

A certain amount of fatty infiltration seems to take place normally in the liver, and it is probably due to the cytolytic action of the blood from the hepatic artery.

The number of toxins found in the toxemia of pregnancy almost equals the number of investigators; but the specific poison has never been found. Norris says (*Prog. Med.*, Sept., 1906, p. 153), "Today we are practically ignorant of the

poisonous material or materials causing pregnancy toxemia." Ewing almost guessed it when he said there was a disturbance in nitrogenous metabolism.

All authorities, however, agree that in the toxemia of pregnancy there are large quantities of leucin and of tyrosin found in the urine. Leucin and tyrosin are produced by the action of trypsin on hemipeptone; hence, in this condition, there is a peptonemia. Granting the digestive powers of the syncytium, *the real toxemia of pregnancy is peptone poisoning, due to the presence of a syncytio-peptone in the blood.*

An American text-book of physiology says, "The amount of an enzyme bears no relation to the amount of peptone it may form, and is altogether out of proportion to the amount of substance in which it affects the changes. Its action, however, is not unlimited; it is ultimately destroyed. When the fluid in which an enzyme and the substance on which it is acting becomes saturated to a certain degree with peptone, the enzymic action ceases. If the fluid be diluted or the peptone removed, the formation of more peptone goes on with the same activity as before." It will be seen from this that a small amount of enzyme, under favorable conditions, might continue to act indefinitely and to form an enormous amount of peptone.

With its constant changing, the blood in the liver could never become so saturated with peptones as to inhibit the enzymic action of the syncytial cells lodged in that organ; their digestive possibilities would be limited only by their vitality.

The placenta having a definite longevity, it is not improbable that the syncytial cells have a corresponding length of life. Their persistence in the uterus after the removal of hydatidiform mole and forming syncytioma malignum, tends to confirm this view. Being of embryonic origin, there can be no real comparison between their longevity and that of the cells of mature organisms. The blastodermic cells which later form teratoma apparently live for years with their activity unimpaired. How long the syncytial cells could exist in the liver is a matter for interesting conjecture. The liver itself must have a poor resistance against proteolytic enzymes, for it contains elements which intensify their activity, and nature seems to have taken great pains to guard it from the action of such substances.

A glance at the receptaculum chyli and the thoracic duct

shows that they are carefully taken past all of the veins that come from the organs of digestion, and only enter the venous system when close to the heart—the opening being just between the internal jugular and subclavian veins. What is the secret contained in this ridiculous-looking organ?

The enzymes concerned in digestion are not found in the blood. Physiologists say that they are precipitated in the intestine. Since they are practically indestructible, what becomes of them; for after digestion they seem to disappear completely?

It is a curious fact that fat is never digested, but only emulsified or split up into smaller globules. The great bulk of the fat in the intestinal tract is absorbed by the lacteals and conveyed to the reservoir of the thoracic duct. Is it not probable that the enzymes are absorbed with it and for a time rendered inert by being held in suspension in a medium on which they cannot act?

Indeed, the logical conclusion would be that several minute globules of fat coalesce around a granule of enzyme and enclose it within the tiny sphere so formed, and while in the exhausted or "rest stage" spirit it away to other parts of the system. This suggests a physiologic use for fats outside of their value as food; and it is that when fat is not present in the intestines in quantity sufficient to enclose the enzymes, those digestants would be carried off with the feces and an enfeebled state of digestion result.

If a large quantity of peptone is injected into the circulatory system, insensibility and coma soon follow, and death is produced by the coagulation of the blood. Naturally, it would be expected that the symptoms of a syncytio-peptonemia would differ very much from this, for the conditions are much more complex than those of an experimental peptonemia, because of the varied powers of the syncytium; for, not only does it possess enzymic functions as varied as those of the organs of digestion, but it has those of the fetal lungs and kidneys as well, and the disease extends over a much longer period of time.

Yet the picture of acute yellow atrophy of the liver occurring in pregnancy includes that of an artificial peptonemia, for coma is usually present at the end, and necroscopists generally find a very viscid condition of the blood. In some cases the blood is thinner than normal and lacking in histologic elements. This may be explained by the fact that when peptones are passed

through a living liver they lose their coagulating power. When the liver in this disease is not too much involved, peptone might be present in considerable quantities and yet not cause coagulation.

The real cause of death in these cases is probably cell-starvation caused by a reversal of osmosis; for peptone will go as readily through one side of a membrane as the other, and were it present in excess in the blood it could easily pass into the digestive tract. After death from peptone-injection much of the peptone can be recovered from the intestines.

Pernicious vomiting might better be explained in this way than by regarding it as a purely reflex phenomenon; for in this condition neither fluids in the stomach nor nutrient enemata are absorbed.

The destruction of the liver is probably not the cause of death, for the volume of that organ is largely in excess of the demands upon it. In dogs and rabbits three-fourths of the liver has been excised and the animals, after recovering from the operation, seemed to suffer no ill effects. (Landois' Physiology, p. 325.) Indeed, the organ probably tends to prolong life by giving up the glycogen and fat which it contains, and so lessens the starvation generally present.

In some cases of acute yellow atrophy of the liver the lobules are found to be more affected in their central portion; this is probably due to a greater amount of bile being in that part of the lobule.

Foster's Physiology says that there are several kinds of peptones. Since a syncytio-peptone was unthought of, it is obvious it could not have been recognized. Various attempts have been made to find the nitrogenous toxin by separating the nitrogen bodies excreted in the urine into different groups. The syncytio-peptone will probably be found in that which is known as "undetermined nitrogen."

Peptone is not normally found in the blood, but when present it is rapidly excreted by the kidneys; hence the kidney lesion when these organs are overtaxed.

The diabetes of pregnancy might also be explained by the foregoing.

The placenta is not normally poisonous; for it is eaten by many animals after its expulsion from the uterus. That it should

be devoured by all the carnivora would seem natural; but when consumed by the herbivora, such as the horse, cow, rabbit and, perhaps, many wild animals, the fact suggests a possible therapeutic use. The toxemia of pregnancy is almost unknown among animals; and it is possible that by the ingestion of syncytial tissue antibodies are formed which confer an immediate and transmit an inherited immunity from this disorder.

The next therapeutic advance will be the making of a syncytiolytic serum which will confer the same immunity on womankind.

If an anti-syncytio-toxin is formed in the maternal blood during pregnancy, it is probably done by an auto-vaccination with the disintegrated syncytial elements that are absorbed when the chorionic villi not used to form the placenta are undergoing degeneration.

The study of the impregnated ovum and the placenta should be of the greatest interest to the biologist. As the vertebrate evolution of humanity is shown in the development of the fetus, so the pre-vertebrate history can be shown in the ovum and the placenta. The fecundated ovum is really an ameba, its tiny chorionic villi are pseudopodia, and it has external digestive powers peculiar to the protozoa. The syncytium is an aggregation of these cells, grouped together, without cell walls and possessing the same digestive powers. They are really marine animals, remote ancestors of the shark and the octopus, and possessing the same insatiate, conscienceless maw of those fierce marauders. Under their baleful influences, the highest evolution of untold millions of years crumbles and totters into the abyss from which all life came, a victim to the primal cruelty of blind, unreasoning activity.

In the effort to perpetuate the race, woman faces monsters, microscopic though they be, just as real and dangerous as those of prehistoric times; and when she succumbs, it is only cytolysis repeated on a larger scale.

*Cause of Cancer.*—The explanation herein given for the causation of the toxemia of pregnancy not only accounts very definitely for the frequency of cancer of the liver and pylorus; but, in a very simple way, explains the causation of all cancer, and perhaps of other phenomena that my limited knowledge fails to include.

We know that embryonic cells possess an erosive or digestive action, that they have the power to proliferate, that they are present in the human body, and may lie dormant for years.

Cancer is more frequent in persons where the general health or vitality is lowered. The most frequent cause of such a state is poor digestion or more or less gastro-enteritis. Such persons are always absorbing bile into the blood; there, coming in contact with the embryonic cell, it acts as a stimulant, an erosive action is inaugurated, and a cancer starts into being. Prolonged jaundice would probably give a similar stimulation.

To put it tersely, *all that is needed to start a cancer is an embryonic cell, some bile, a medium containing elements necessary to its nutrition and a suitable receptacle.* The different forms of malignant growths can readily be accounted for, as the embryonic cell contains potentially all of the histologic elements of a developed organism.

Nature evidently produces a syncytiolytic serum or an anti-syncytio-toxin which destroys syncytial cells. Such a serum could probably be made in the laboratory, as placentas could easily be obtained. Since a syncytial cell has so little evolved from the early embryonic type, it would be closely allied to cancer; and a serum that would destroy the one would probably destroy the other.

Nature has taken great care to keep bile and enzymes apart; for their mingling means digestion, and digestion is only an orderly dissolution, a process of hydrolysis. A rain drop against the mountain side, a flash of lightning from the clouds, this is Nature's method for digesting food for the plant world. Digestion in the body is probably just as simple.

Truth is always simple and correlated. With facts falling so easily into place to complete my chain of logic I feel that I am justified in announcing the discovery of a new law of pathogenesis. That law is:

WHEN AN INVADING OR MISPLACED CELL POSSESSING PROTEOLYTIC, AMYLOLYTIC OR LIPOLYTIC ENZYMES COMES INTO CONTACT WITH BILE IN SUFFICIENT QUANTITY IT TAKES ON NEW ACTIVITIES, ITS DIGESTIVE POWERS ARE DOUBLED, AND THE TISSUE IN WHICH THE MEETING OCCURS HAS ITS POWER OF RESISTANCE LESSENED TO A CORRESPONDING DEGREE.

This law, simple as it is, accounts for the genesis of all malignant growths. There are probably other enzymes that behave

similarly, but experimental physiology has not as yet demonstrated their existence. According to the above law, the reserve force of a cell is less than one hundred per cent. of its usual activities.

I have not had time to study any further into this subject ; but I cannot close without stating that I feel sure that hematoidin is the particular component of bile that gives this increased activity to enzymes ; and that the iron in the hemoglobin is responsible for its peculiar power.

Iron, in two respects, is unique and mysterious. It has magnetism and the power to convert oxygen into ozone. Magnetism is, in some way, related to electricity ; and the making of ozone suggests an electro-chemical activity. It is barely possible that the ozonized oxygen coming in contact with sodium creates a tiny electric spark on the carbon of the hematoidin, warming the nitrogen in the embryonic cell—thus supplying the link between chemistry and biology—and starting the cell into renewed activity. "Love's young dream" is awakened in its heart, and the solitary waiting cell proceeds to end its lonely life, not by suicide, but by creating a family after its own kind.

Hematoidin probably does for the animal world what chlorophyl does for the vegetable. While the formula for chlorophyl has never been definitely determined, it contains the same elements as hematoidin—carbon, nitrogen, hydrogen and oxygen. Hematoidin is probably derived from chlorophyl by the ingestion of green substances, the need of which we at times so strongly feel. The iron in the hemaglobin does for the hematoidin what sunlight does for the chlorophyl, creates ozonized oxygen. Glycogen is an animal starch, and hematoidin is doubtless an animal chlorophyl.

The liver is the least differentiated organ of the body, is very primitive in structure, and is formed early in embryonic life. The more primitive an animal or the nearer to the embryonic state, the larger is the liver. This organ is relatively larger in marine animals than in land animals. The marine animals no doubt get their hematoidin from the chlorophyl in the algae, which are also rich in iodine. Iodine has a marked effect on the metabolism of the liver and doubtless is a compound.

The whole color scheme of fruits and flowers is produced by chlorophyl, which some day will be found to be a component part of iodine.

The original liver cell was probably a marine animal coexistent with the ameba. When the life span of the earth was too short to make even a second on the dial of eternity, these creatures swam in a shoreless sea, the lobule feeding on the algae, only in turn to have its helpless succulent body devoured by an ameba. These are the original herbivora and carnivora. The first toxemia of pregnancy was probably a ptomain poisoning induced in an ameba by an over-indulgence in liver cells, and, while in the awful throes of a primal stomach-ache, mitosis was invented to ease him of his burden.

Hematoidin shows the evolution of function from crystal to man, and the cell the evolution of the ameba to the same high state.

The study of mitosis may yet overthrow the nebular hypothesis, and the history of the universe be read in an embryonic cell.

*Primal or Universal Antitoxin.*—The peculiar immunity of nursing babes from all contagious diseases and the lightness of the attack when acquired, suggests an immunizing substance in the mother's milk. This substance is probably derived from the anti-syncytio-toxin and suggests the possibility of a primal or universal antitoxin.

Such an antitoxin could be used as a preventive or cure for all of the exanthemata and eruptive diseases, syphilis, typhoid fever and phthisis pulmonalis. Owing to the great oxidizing power of the syncytial cells, their administration by mouth should prove of great value in nephritis and in the so-called uric-acid diathesis, and so prevent fibrosis.

If this universal antitoxin should prove a solvent for fibrous tissue, life might be prolonged to what Metchnikoff calls the normal period—that is, from 150 to 200 years. With most diseases eliminated and death held in leash by the primal forces of life, man would have his immoralities only to contend with, and "The Golden Age" written of by Plato and Pliny would come again to earth.

*Methods of Preparation.*—In a subject so new, the imitation of nature would seem the best way to attempt the initial experimentation. As already pointed out, one of the methods is an autovaccination with the degenerating cells of the villi of the chorion

that are not used to form the placenta. This would probably come under opsonins.

The serum from the blood of any healthy pregnant animal, cows excepted, because their enzymes are probably depleted by excessive milking, would be a ready-made antitoxin for many conditions. A glyceride, powder or tablet, prepared from the syncytium or placenta, such as are now made from different animal substances, would probably be the better method of administration in some diseases. This serum should never be used intravenously, but injected into the tissues as is diphtheria antitoxin. Investigation in this line will probably lead to the discovery of a still simpler substance, one capable of a more universal application.

If the ideas contained in this paper are found to be even approximately correct, they will materially modify our concept of evolution and demonstrate that the processes of nature are few and simple.

(Since the above was written my attention has been called to an article by Hofbauer in the Beitraege zur Aetiologie und zur Klinik der Graviditaets-toxikosen (Cholaemie, Eklampsie, Hyperemesis), in *Zeitsch. f. Geburts. und Gynaek*, 1907, pp. 200–74; and to the Review in Gynecology in *Progressive Medicine*, June, 1908, p. 166, both of which bear more or less on the subject.)

**Dr. Rosenau** had never seen a case of puerperal eclampsia. Even outsiders might discover sidelights upon the problem from other fields. Dr. Anderson and himself had been working in the Hygienic Laboratory upon the problem of hypersusceptibility; they had found that an animal may be hypersensitized by the injection of a strange protein; that is to say, a strange protein may be injected into an animal without deleterious effect, but a second injection of the same protein may prove lethal, the first injection sensitizing the animal to the protein administered on the second occasion. This phenomenon led to the trial of various proteins—egg white, protein of milk, vegetable protein, etc.; all were found to produce the same effect. The question arose, In puerperal eclampsia is the blood of the fetus a strange protein for the mother? Female guinea pigs were injected with fetal blood; at a second injection nothing happened. This was not surprising, since proteins of the same species do not produce the phenomenon; also the result of the experiment corresponded to the clinical observation that eclampsia is not of fetal origin. The dictum of Ehrlich, that the body has a horror of autoxication

must be true. Experiments were next made with placental extracts. A full-term guinea pig was injected with placental extract without result; a second injection produced violent illness. The surprising conclusion was reached that the placenta contains a strange protein, which may produce hypersusceptibility to itself. He was not yet prepared to say that this is an explanation of puerperal eclampsia, though it seems likely that there may be a primary, and then a secondary invasion of the mother by syncitial cells, with the production of illness from the hypersensitizing influence of the first invasion. Eclampsia is probably of several varieties; the hypothesis advanced by him would probably not explain all cases.

The discussion was closed by **Dr. Wood** with a repetition of a parenthetical statement as to the hypothetical agency of fats in enclosing enzymes within their droplets and conveying them directly to the general circulation through the receptaculum chyli.

## CASE OF CHRONIC ULCER OF THE DUODENUM.*

By JOHN F. MORAN, A. B., M. D.,

Washington, D. C.

George B. (white), age 42, weight 165 pounds, well nourished, complexion clear. History of repeated attacks of acute alcoholism. No history of syphilis or epilepsy. His father was a chronic alcoholic; mother died of cancer of stomach. Was first seen by me, January 8, 1908; patient had persistent vomiting, with epigastric pain and tenderness, lasting several days. Pulse and temperature normal. Examination: liver margin two inches below normal line; no jaundice; urinalysis showed abundance of urates, no albumin. A tentative diagnosis was made of stenosis of the pylorus possibly due to ulcer. From the fact, however, that the patient improved under anodynes and restricted diet and was able to go about at the end of a week, and on examination ten days later showed absence of symptoms pointing to ulcer, I concluded that it was a case of gastritis with pyloric spasm.

February 11, one month after the first attack, I was again summoned, and found that the same symptoms had recurred

*Reported, with specimen, to the Medical Society, May 6, 1908.

following a spree; a mitral regurgitant murmur was also detected. Similar treatment was given, but without success. On the third day of illness he had three convulsions, supposed to be uremic. The urinalysis, however, was negative. February 18 had hemorrhage from stomach, estimated by the nurse at about three quarts. Prostration was marked. Gave strychnia and salt solution subcutaneously. He was moved to George Washington University Hospital the same day at 5 P. M.; that night he became delirious, coma followed and continued for 36 hours. After emerging from coma his mind was quite clear at intervals up to his death. Following the hematemesis the temperature rose to 103.6 and then gradually declined, reaching normal on the 21st, three days after the hemorrhage; the pulse, weak and compressible, ranged from 100 to 130; respiration, 26 to 40 and labored; urine voided involuntarily; stool contained dark clotted blood.

The treatment consisted of normal salt solution subcutaneously and by rectum, strychnia, digitalin and morphia as required. In spite of active stimulation he gradually became weaker and died at 4.55 A. M., February 27.

Two urinalyses made after admission to hospital gave sp. gr. 1010, acid reaction, no albumen or sugar, few hyaline casts, abundant urates and uric acid crystals.

The blood examination on February 20, two days after the hemorrhage, showed the red blood count 2,059,600; hemoglobin, 30 per cent.; leucocytes, 12,800. February 23: red blood count, 2,560,000; hemoglobin, 40 per cent.; leucocytes, 26,600. February 25: red blood count, 1,964,000; hemoglobin, 30 per cent.; leucocytes, 16,600.

Necroscopy by Dr. D. S. Lamb, assisted by Mr. J. S. Neate. Rigor mortis marked; body well nourished but surface very pale; general edema, bloody edema of scalp. Brain pale; arachnoid showed many opacities superiorly; small old hemorrhagic focus in caudate nucleus, one cm. long, one-half cm. deep. Neck and spine not examined. Abundance of turbid fluid in pleura and pericardium. Lungs partly collapsed, apparently normal. Heart pale, somewhat fatty; coronary arteries normal; slight atheroma of mitral valve and ascending aorta; liver pale, somewhat fatty, gallbladder empty; spleen soft; head of pancreas somewhat indurated, body and tail normal; stomach somewhat dilated, walls thickened; contents: much mucus and dark blood clots that were partly macerated.

The duodenum where it joins the pylorus was much thickened and deeply ulcerated ; at the bottom of the ulcer was a blood-vessel with two perforations. Much feces in colon ; appendix normal ; kidneys pale, surface irregular, capsule readily removed, a few small cortical cysts, small tubercle-like nodules in one suprarenal capsule.

Microscopical examination by Mr. J. S. Neate, Army Medical Museum, showed as follows: Chronic diffuse nephritis ; fatty degeneration of liver, incipient cirrhosis and focal necroses ; pancreas, acute inflammation ; no malignant tumor found.

The interesting features of the case were the existence of such a large ulcer without marked continual clinical symptoms and the presence of a chronic diffuse nephritis without disturbances of vision, and a comparatively negative urinalysis. Whether an operation would have saved the patient, if performed at time of the first attack, in the presence of the above history and the pathological findings, is to my mind exceedingly doubtful.

**Dr. D. S. Lamb** read notes upon the autopsy findings. He commented upon the unusual extent of infiltration and evidence of chronicity. The position of the ulcer indicated that it was originally a solitary ulcer, the usual cause of which is embolism. Was the origin of the disease in the heart or kidney? As in most such cases it was impossible to tell. It was singular that no symptoms clearly pointing to the condition were present until shortly before death.

**Dr. Williams** said that an interesting feature was the finding, at autopsy, of a hemorrhage into the caudate nucleus. Observations on the extirpation of the caudate nucleus in dogs show that when the head is extirpated dogs exhibit great rage ; when the tail is extirpated they exhibit fear. Were there any emotional symptoms in this case?

**Dr. Gwynn** had seen this patient before he fell under Dr. Moran's care. The diagnosis made at the time was alcoholic gastritis. Afterwards Dr. Gwynn was called in emergency on account of hemorrhage from both stomach and bowel ; as most of the blood came from the bowel he made the diagnosis of duodenal ulcer. Examination of the heart revealed a murmur like that of mitral regurgitation ; it was interesting to note that the necropsy showed no heart lesion. The necropsy also revealed chronic diffuse nephritis, which no doubt accounted for the convulsive seizures in the case.

**Dr. Barton** said that the history indicated that there had been great hemorrhage into the stomach, and inspection of the speci-

men showed a vessel lying open in the ulcer. These features suggested that the internal administration of adrenalin chloride might have been beneficial.

**Dr. Moran,** replying to Dr. Williams, said that there had been no emotional disturbances in the case. The convulsions were evidently due to the nephritis ; there had been, however, no urinary changes to point to the condition. No history of syphilis or epilepsy was obtained. He doubted the efficacy of adrenalin chloride for the hemorrhage in this case, on account of the large size of the bleeding vessel.

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## NOTES ON SNAKE POISONING IN THE UNITED STATES.*

By PRENTISS WILLSON, M. D.,

Washington, D. C.

Before taking up the subject of Snake-poisoning in the United States it will be necessary to consider briefly some points in regard to the venomous snakes. Contrary to the usual opinion, there are only four of these in the United States—the rattlesnake, the southern water-moccasin, the copperhead and the coral snake. There are some thirteen different species of rattlesnakes and two of coral snakes, but their differentiation is not of any great practical importance to the physician. The rattlesnake, water-moccasin and copperhead belong to the family known as pit vipers, so named from the presence of a deep fossa on the face, between the nostril and the eye. All these reptiles have two hollow erectile fangs in the anterior portion of the upper jaw, each of which is connected by means of a duct with one of the poison glands, of which there are two, situated one on either side of the head below and behind the eye. These glands not only secrete but act as reservoirs for the venom. They are closely surrounded by muscles, especially anterior temporal and the external pterygoid. When preparing for hostilities, the pit vipers coil the body, the upper portion of which rests in a series of S-shaped curves on the mass of coils below. In striking, the reptile simply contracts the muscles on the convexities of these curves, causing the head to be shot forward with such speed

* Read before the Medical Society, April 1, 1908.

that the eye cannot follow its movements. Synchronously with this act the mouth is widely opened and the fangs erected by a rotation of the maxillae upon the lachrymals and frontals, which causes the fangs to sweep downward through the segment of a circle from their quiescent position parallel with the roof of the mouth until they come to occupy a position quite comparable to that of the canine teeth of the carnivora. Having imbedded its fangs in this manner, the lower jaw is closed in a vicious bite, the muscles concerned in this action, by their contraction, press the poison glands as in a vice, and their contents are forced out along the ducts through the fangs and into the tissues in which these are imbedded.

Fortunately the recognition of these dangerous reptiles is comparatively easy. All possess the deep labial pit, a structure not found in any of the innocuous species, the pupil of the eye is vertical and cat-like instead of circular, and there is but a single row of teeth in the upper jaw, two rows being found in all the harmless snakes. The presence of the fangs in all the pit vipers, and of the rattle in the rattlesnake is, of course, decisive. In addition, these snakes all possess undivided scales on the ventral surface of the tail, a double row of scales being present in all the non-poisonous snakes.

In this country the coral snakes form the only exception to the general statement that any snake without the labial pit, and showing a double row of ventral scales on the tail, is perfectly harmless. Fortunately these reptiles are colored in such a way as to make their avoidance an easy matter. The color scheme consists of alternate rings of black and crimson, completely encircling the body, and separated by narrow rings of a bright yellow. The coral snakes are very retiring in their habits and rarely seen in the daytime. The mouth is small, the fangs are permanently erect, and smaller both relatively and absolutely than the fangs of the pit vipers. These snakes are placed in an entirely different family from the pit vipers, and are more nearly related to the dreaded hooded cobra of India.

The distribution of the venomous snakes in the United States is of considerable practical interest. North of a line drawn directly westward from the Atlantic coast about the latitude of southern Virginia, there would be in the eastern States the copperhead and one species of rattlesnake, in the States of the middle

west, two species of rattlesnakes, and in the whole of the great northwest, only one species of rattlesnake in any one locality. South of this line and east of mid-Texas there are found the copperhead, southern water-moccasin, one species of coral snake, and about four species of rattlers. West of mid-Texas there are one species of coral snake and five or six species of rattlers.

Snake poisoning in the United States has never been frequent enough to attract to the subject any great practical interest. In India, however, the mortality from this cause is stated by Braddock (*N. Y. Med. Jour.*, Nov. 9, 1907), to be 22,000 annually, indicating a total annual morbidity of approximately 100,000. It is very difficult to say just how frequent snakebite is in the United States. The vital statistics of Florida show 13 deaths from this cause in the seven years from 1892 to 1899. It seems probable to the writer that the annual morbidity in this country would fall short of 500 cases. In regard to the relative frequency of bites by the different species it is possible to be more definite. The writer has collected as a basis for his study of snake poisoning 740 cases, 440 from the literature and 300 from the various private sources. In 566 cases in this series the species of snake causing the injury was stated. Of these 566 cases 72 per cent. were due to rattlesnakes, 17.1 per cent. to the copperhead, 9.3 per cent. to the water-moccasin and only 1.4 per cent. to the coral snakes.

A brief survey of the toxic properties of venom is necessary to an understanding of what is to follow. A good idea of its complex nature is afforded by the list of different toxic principles contained in various snake poisons as given by Martin and Lamb in "Allbutt's System," Vol. II, Part II. According to these authorities there are present in venoms: a powerful fibrin ferment, an antifibrin ferment and a proteolytic ferment; various cytolysins capable of acting on erythrocytes, leucocytes, endothelial cells of blood vessels, nerve cells and the cells of various other tissues; agglutinins for red blood corpuscles; an anti-bactericidal body of the nature of anti-complement; a neurotoxin or neurotoxins with affinities for all nerve cells and those of the respiratory center particularly; a neurotoxin with affinities for nerve endings in muscles and those of the diaphragm in particular; and a substance which causes greatly-increased tone in cardiac muscle. It is not to be supposed that all these bodies are present in any one

venom. This list represents the sum total of toxic principles found in venoms so far studied.

The action of the pit-viper venoms may be briefly summarized as follows: Locally they produce great swelling, softening and disintegration of the subcutaneous tissues and even of the muscles, bloody extravasations, and determine a marked local predisposition to ordinary septic infection.

On the nervous system they have a profound depressant action, affecting both the motor and sensory sides. In the case of the copperhead and water-moccasin venom there seems to be a slight tendency toward a selective affinity for the respiratory center, which is absent in rattlesnake venom. All markedly depress the vaso-motor center. This action on the vaso-motor center determines a decided and dangerous fall in blood pressure, due to a dilatation and engorgement of the portal system. The heart seems to be little, if at all, affected directly.

On the endothelium of the capillaries and smaller vessels the cytolytic activity of the venom is so great as to cause bloody extravasations and petechial hemorrhages in various parts of the body. In this action, according to Flexner and Noguchi (*Univ. Penn. Med. Bull.*, 1901–02, XIV, 438), rattlesnake venom is respectively ten and one hundred times as potent as water-moccasin and cobra venom. This hemorrhagic activity of the pit-viper venoms is one of their most characteristic features.

On the blood, when injected directly into the vessels in large quantities, rattlesnake venom has the power to cause instantaneous intravascular thrombosis. When injected subcutaneously and gradually absorbed, the action on the blood is directly the opposite, effectually preventing coagulation for a period of some days. This is the action seen clinically, and naturally predisposes to the occurrence of hemorrhage. A most important action on the blood is the entire destruction of the anti-bactericidal power of the blood serum, causing a decided predisposition to systemic infection. The action of venom on the blood cells is of little clinical importance.

The coral snake belongs to a group of venomous species known collectively as the venomous colubrines, a group including the most deadly species known. Its venom is correspondingly dangerous, its main toxic activity being directly against the respiratory center in the medulla, failure of respiration being the usual

cause of death. Fortunately, bites by these snakes are so extremely rare as to render unnecessary any detailed discussion of the toxic activity of their venom.

Knowledge concerning the pathology of venom poisoning in man is largely dependant on experimental findings. Four autopsies on man have been recorded following death from rattlesnake bite. The records of these necropsies are most imperfect, but it may be stated that a perfectly fluid blood, congestion of the abdominal viscera and of the brain and its meninges, petechial hemorrhages in the mesentery, omentum and intestinal walls, and the presence of free blood in the stomach, intestines and pleural cavities seem to be the most frequent lesions.

Microscopically, animal experiment has demonstrated necrotic changes in the parenchymatous cells of the various viscera and nervous system, especially in cases where life was prolonged for some time. In cases of rapid venom poisoning, no microscopical changes could be demonstrated.

The symptoms following poisoning by the rattlesnake, copperhead or moccasin, are both local and general.

Briefly, the local symptoms are those of a rapidly spreading inflammatory process of severe grade and with decided necrotic and hemorrhagic tendencies. The bitten part rapidly becomes enormously swollen, discolored and mottled from blood extravasations into the subcutaneous tissues, and in severe cases is covered with vesicles and bullae containing a blood-stained serum. In bites on the extremities the swelling and discoloration often extend to the trunk, in rare cases becoming general.

Systemic symptoms usually manifest themselves within a short time following the bite and rapidly become alarming. In the main they are those of a marked state of collapse. The pulse is rapid and of remarkably low tension. Respiration is usually shallow and rapid, occasionally slow and stertorous. The skin is cold and bathed with a clammy sweat. The temperature is markedly subnormal. Nausea and vomiting are almost constant. Diarrhea may set in, and retention of urine or partial suppression is occasionally noted. From a condition of this character, exciting the gravest fears, the patient may rapidly pass to one of comparative safety. On the other hand, there may be no reaction, the patient sinking continuously until death ensues.

In severe cases various symptoms not present in typical cases

may be observed. Among these the various manifestations of the hemorrhagic tendency induced by the poison are important. Among other symptoms may be mentioned: Temporary amaurosis and deafness, paralysis of the different ocular muscles and various subjective nervous phenomena.

The most important complications of snake poisoning are septic infection and acute alcohol poisoning. The latter will be considered later. It is obvious that the devitalized and even necrotic condition of the tissues around the wound, taken together with the destruction of the bactericidal properties of the blood-serum, produce a condition markedly predisposing the patient to both local and systemic infection, and an examination of the reports of cases discloses how very frequently septioemic and pyemic processes are observed clinically. The importance of guarding against this complication has hardly been sufficiently emphasized in the literature.

The writer is indebted to Dr. Hawkins, of Louisiana, for the report of a case apparently unique in medical literature, tetanus following snake bite. The patient, an adult male, first came under observation one week after having received the bite of a large rattlesnake on the thumb. Well marked symptoms of tetanus were present and the patient died from this cause two days later.

A very frequent sequel of bites on the fingers is a complete ankylosis of the bitten part. Permanent enlargement of the bitten limb has been observed in a few cases; anemia is an occasional sequel.

The question of the possibility of a periodic recurrence of the symptoms of snake poisoning is interesting. The only attempt to deal with the subject in a scientific way has been made by Dr. Yarrow (*Med. News*, Phil., 1887, L., 623), of this Society. Piffard (*Med. Record*, N. Y., 1875, X, 62) has reported the periodical recurrence, at regular intervals of three months, of a vesicular eruption on the hand, associated with contractures of the flexor tendons, in the case of a young woman bitten by a rattlesnake. These strange phenomena lasted over ten years. Demeurat (*Gaz. Hebdom. de Med. et de Chirurg.*, 1863, X, 736) reported a case of annual recurrence of pain, nausea, lassitude and anorexia associated with the appearance of a bullous eruption. The wound was inflicted by the ordinary European viper, and the condition lasted for sixty years.

The cause of death in snake poisoning varies. Fatal terminations in a few minutes are probably due to hemorrhages at vital points or to intravascular thrombosis. Such cases are very rare. The usual cause of death in pit-vipers poisoning is undoubtedly the failure of circulation, resulting from lowered blood pressure, and determining a secondary failure of the already weakened respiratory center. In cases where death is delayed for days, weeks, or even months, it is always due to sepsis. Of the 78 fatal cases in the series 10 per cent. were due to this cause.

The duration of the illness following snake poisoning varies within the widest limits in cases which recover. When there is no septic infection, however, recovery from the systemic symptoms is usually complete on the second or third day. The wound, on the other hand, frequently is quite slow in healing, depending, naturally, upon the amount of sloughing and necrosis. The duration of the fatal cases shows less variation. The time elapsing before death was stated in 50 of the 78 fatalities noted in the series of 740 collected cases. Of these 50 cases 16 per cent. died in less than one hour, 42 per cent. in less than 6 hours, 78 per cent. in less than 24 hours, and 8 per cent. during the second 24 hours, leaving 14 per cent. of cases in which death was delayed more than two days.

The diagnosis of snake bite is usually obvious from the history of the case. The question usually needing decision is in regard to the venomous or innocuous character of the snake causing the injury. This is best determined by an examination of the reptile. In cases where this is impossible, an examination of the wound will disclose the presence of usually two, but occasionally only one, small punctured wound, the fang wounds, situated in the center of a rapidly spreading tumefaction.

Knowledge concerning the mortality following snake bite in the United States has been most unsatisfactory. Mitchell (*Smithsonian Contrib. to Knowledge*, 1860, XII) noted a mortality of 8.7 per cent. in 57 cases of rattlesnake poisoning found in the literature prior to 1860.

There were 78 deaths in the series of 740 cases collected by the writer, representing a mortality of 10.5 per cent. This figure is believed to represent the actual mortality rate in this country with considerable accuracy. Thus it was found that the mortality of 440 cases taken from the literature was 10.2 per cent., and that

of 300 cases from other sources 10.7 per cent., a variation of only .5 per cent.

It may be stated that the prognosis in snake poisoning depends ultimately, aside from the toxicity of the venom, upon the dose of venom absorbed by the system in proportion to the body weight.

This will be influenced favorably, or otherwise, by several factors, as by the amount of venom injected in the wound. This will, of course, be greater the larger the snake, since the capacity of the glands and ducts is directly proportioned to the size of the reptile. It will also depend on the amount of venom stored in the glands at the time of the bite, and, therefore, since the elaboration of the venom is a comparatively slow process, on the time elapsing since a previous bite. The degree of perfection of the bite is also of importance in this connection, as when the snake only succeeds in imbedding one fang, or where one or both fangs completely perforate or straddle a small member like the finger. The species is of importance in determining the prognosis, because on this factor, in a large measure, depends the probable size of the snake. The mortality following bites of the different species was found to be as follows : In 408 cases of rattlesnake bite, 11.7 per cent.; in 97 cases of copperhead bite, 5.1 per cent.; in 53 cases of moccasin bite, 16.9 per cent.; in 8 cases of coral snake bite, 75 per cent. It will thus be seen that bites of coral snakes, moccasins, rattlesnakes and copperheads are dangerous in the order named.

The location of the bite has a decided bearing on the prognosis. Thus it is greater when the bite is on a part with a rich and active blood supply, because here the danger of intravascular injection of the venom is markedly increased, the absorption is greater and more rapid, and in cases of bites on the head and trunk the application of ligatures to prevent absorption is difficult or impossible. These points should be borne in mind in considering the varying mortality rates of bites on different parts of the body, which were as follows : In 12 bites on the head and trunk, including bites on the tongue, throat, cheek, eyebrow, scalp, lip, vulva and penis, the mortality was 58.3 per cent. Next to those on the head and trunk bites on the upper extremity were most dangerous. 61 bites on the fingers gave a mortality of 9.8 per cent.; 67 on the head and wrist, of 19 per cent.; 11 on the arm, of 18.1 per cent.; a total of 148 bites on the upper extremity

with a mortality of 16.8 per cent. In 123 cases of bites on the foot and ankle there was a mortality of only 5.6 per cent.; in 55 on the leg a mortality of 14.5 per cent.; a total of 183 bites on the lower extremity, with a mortality of 8.7 per cent. The mortality of 335 bites on the extremities was 12.2 per cent. as compared with 58.3 per cent. in the 12 bites on the head and trunk. The point of greatest interest in these figures lies in the pronounced difference between the mortality of bites on the upper and lower extremities, the former being practically double the latter.

The influence of the age of the patient on the prognosis is well shown by the following figures: Mortality in 23 cases in children from one to five years inclusive, 26 per cent.; in 36 cases between six and ten years, 16.6 per cent.; in 51 cases between eleven and fifteen years, 9.8 per cent.; in 19 cases in children, the exact age not given, 36.8 per cent.; a mortality of 18.6 per cent. in a total of 123 cases in children.

If time permitted it would be interesting to consider the history of the treatment of snake bites. The list of drugs and therapeutic procedures made use of in this connection includes almost everything conceivable from Calmette's anti-venene to the application of cloths saturated in urine or of poultices made by splitting open live chickens.

The supreme indication to be met is the prevention of the absorption by the system at large of a fatal dose of the venom injected at the wound. If this cannot be met the prognosis becomes exceedingly grave, no matter what line of treatment is carried out. It follows, therefore, that most dependence is to be placed in the local treatment, which must have for its object the prevention and retardation of absorption. Usually these cases present themselves for treatment after an hour or so of more or less complete ligation. Under these circumstances the application of ligatures to retard and impede, but not entirely check the circulation, a free dissection of the wound, associated with free multiple incisions and massage in warm antiseptic solutions to promote the escape of blood and serum, offer the greatest likelihood of getting rid of some of the venom.

In regard to the use of potassium permanganate, chloride of gold, chromic acid and other chemicals, it may be stated that all have the undoubted power of destroying the venom if brought

in contact with it in sufficient concentration. These drugs are only meant to be employed locally, and have no effect on the venom once it has been absorbed. The diffusion of venom through the tissues is so rapid that the amount chemically destroyed by these drugs is probably so slight as to be negligible except in cases where they can be applied almost immediately hypodermically or through deep incisions through the fang wounds.

The value of labial suction, cauterization, excision of the bitten area and various other procedures which are recommended will depend largely upon the degree to which the venom has become diffused through the tissues. It is important that the relaxation of the ligatures should be gradual and intermittent, several deaths in the series having been attributed to too sudden removal of the ligatures. Amputation of a finger would certainly be justifiable in cases where the prognosis was considered to be at all grave. In all surgical procedures around the wound the importance of avoiding infection must be emphasized.

The general treatment of these patients may be briefly summarized as follows: The patient should be kept quiet and warm, with the head low. The use of strychnine and alcohol in mildly stimulating doses may be tried, but probably does no good.

Huxtable has shown that the mortality in 113 cases of snakebites treated with strychnine was 13.2 per cent., and in 313 treated without it 4.1 per cent. The idea that alcoholic intoxication is a specific in these cases has been exploded. It may be noted that death was attributed to alcoholic intoxication rather than to venom poisoning in four of the 78 fatal cases in the series.

The main therapeutic indication to be met in these cases is to keep up blood pressure. This may best be done by the use of adrenalin, bandaging of the limb, abdominal compression, and salt solution, intravenously, if necessary.

In regard to the use of antivenenes the following points may be made:

1. They are unobtainable commercially in this country.

2. In order to be successful they must be specific, that is, prepared with the venom of the same species of snake as that causing the injury.

3. Even if it were possible to obtain an antivenene specific against pit-viper venoms, in order to be of much value it would

have to show a higher degree of potency than the antivenenes now made. Thus 1 c.c. of Calmettes serum protects a guinea pig against 10 M.L.D.'s of cobra venom, but the same amount of diphtheria or tetanus antitoxin will protect against 100,000 and 200,000, M.L.D.'s of their respective toxins.

**Dr. Yarrow** complimented Dr. Willson upon the thorough research evidenced by his paper, and called attention to a venomous snake not included in Dr. Willson's list : the *alanus bicollis*, probably an extralimital reptile, observed on several occasions in the Gulf of Mexico ; it resembles the harlequin snake. Some years ago Dr. Yarrow had read of a sailor on a French man-o'-war who had been bitten by a snake answering the description of the alanus and who had died from the bite. The vessel was cruising in the Gulf, and the snake had made its way up the hawser while the ship was lying at anchor.

He referred to a popular misconception as to danger from the water moccasin of the Potomac ; this snake is perfectly harmless.

His interest has been particularly centered in the anniversary recurrence of symptoms, the treatment and first-aid treatment of snake bite. Dr. Samuel Woodhouse, U. S. Army, showed him a finger bitten by a rattlesnake while the doctor was on an expedition to the Zuni Indians. He had recurrences of the symptoms for a number of years. Dr. Yarrow also mentioned the cases of Trout and Schindler. There was no hysteria or other neurotic element in these cases. Dr. Sweeny had reported a case in which symptoms recurred for thirty years. Recurrences usually have been observed in victims of moccasin or copperhead bites.

The crotalus is neither aggressive nor treacherous ; this snake nearly always gives warning and prefers to run away when disturbed. Dr. Yarrow mentioned the interesting fact that during fifty years of snake dances among the Moki Indians there had been only one death from snake bite. These Indians had an antidote which he had been unable to identify ; he suspected, however, that it was derived from some species of euphorbia. While among the Moki villages he felt that if he encountered a case of snake bite he had a sure antidote in potassium permanganate ; his experiments with it afterward, however, demonstrated that it is devoid of any efficacy. In these experiments many other vaunted antidotes were tried and all were found worthless ; a partial exception to this general result was extract of jaborandi or pilocarpin, some cases were apparently cured with this drug. A curious remedy advocated by a Dr. Higgins was the extracted gall of serpents ; the doctor claimed that it was specific. Experiments proved that it also was a failure. Aqua ammonia has been found worthless.

A case of cobra poisoning cured by a curious method is of record : a man was bitten and very shortly was seen by a physician, who tied the patient's wrist to the back axle of his buggy and then drove furiously to his office. The man was cured by the time of his arrival. The pilocarpin previously mentioned probably acts in the same way.

**Dr. T. C. Smith** had been called in consultation to see a man who had been bitten by a pet copperhead. The symptoms were great asthenia ; rapid, weak pulse ; locally the arm was swollen, smooth, red and covered with large blebs—looked like a severe dermatitis.

While on an outing in the Bull Run Mountains, a dog was seen to become suddenly frightened and distressed, and it was found that he had been bitten on the nose by a copperhead. The dog was caught, the nose squeezed, milk punch was administered, and the dog recovered.

**Dr. E. L. Morgan** asked if the rattlesnake poison in Arizona is not more powerful than in the State of Washington. He was under the impression that Southern are more venomous than Northern snakes. The usual treatment of snake bite used by the Indians, with whose habits he was familiar, was suction.

**Dr. Kinyoun** asked whether Dr. Willson had included in his paper a number of fatal cases collected by Dr. Arnold, of the Navy. Dr. Kinyoun had undertaken to study some cases in the literature, but had been unable to trace any fatal cases in adults. Dr. Marshall, of the University of Pennsylvania, had had the same experience. Dr. Arnold, by means of a circular letter, had collected 41 fatal cases from rattlesnake poisoning. Dr. Kinyoun had collected in Florida 3 fatal adult cases of rattlesnake bites, and the case of a boy who received a fatal bite from a copperhead. As to the fangs of the rattlesnake, he had studied this reptile's method of striking while collecting venom from one of the species, and had found that the fangs are not perpendicular to the jaw but are thrown out to about an angle of 30 degrees, and are used somewhat like a dart.

**Dr. Kober** was unable to appreciate any physiological or chemical explanation of the anniversary symptoms, and felt inclined to doubt the authenticity of any case unless seen by Dr. Yarrow himself. He complimented Dr. Willson on the practical and scientific treatment of the subject. He had doubled the statistics hitherto available, and the paper would be most valuable for future workers upon the subject.

**Dr. Willson** called attention to the fact that the copperhead is closely simulated by the blowing viper or sand snake, which is quite harmless.

He also felt skeptical as to most cases of recurrent symptoms

of snake poisoning, but Pfiffard's case could not be doubted. Dr. Willson was entirely unable to appreciate the possibility of an albuminous toxin remaining in the system long enough unimpaired or undestroyed to produce anniversary symptoms ; he could only explain the phenomenon on the hypothesis of the production of a tissue habit or the establishment of a neurosis. To Dr. Kinyoun he replied that he had not been so fortunate as to see Dr. Arnold's cases, but he had found in the literature numbers of instances of snake bite fatal to adults.

## THE IMPORTANCE OF MODIFICATION OF THE SENSIBILITY IN THE DIAGNOSIS OF DISEASE IN THE LIGHT OF RECENT NEUROLOGICAL RESEARCH.*

(Abstract.)

By TOM A. WILLIAMS, M. B., C. M. (Edin.),

Washington, D. C.

The paper shows:

I. The fallacies which lurk in the current faulty methods of examining the sensibility and how to avoid them, as, for example (*a*) the stimulation of deep sensibility when the observer believes he is investigating the sense of touch. (*b*) The fault in technique which allows the patient's perception of attitudes to be complicated by kinesthetic impressions while being examined. (*c*) The methods of avoiding suggesting symptoms to impressionable patients.

II. The paths in which are grouped sensory impulses in the periphery change their arrangment in the cord. The combinations in the cord are (*a*) heat, cold and pain of all degrees and kinds which run in the heterolateral Gower's column, both intermingled and in close proximity to one another; their decussation, however, requiring for completion 2 to 8 segments, generally 5 or 6. (*b*) Unconscious afferent impulses of attitude and tonus both passing in the homolateral dorsal spino-cerebellar and in the hetero-lateral spino-cerebellar tract. (*c*) Our conscious sensations of the attitude of our limbs and trunk, however, pass in the

* Read before the Medical Society, April 8, 1908. The article in full will appear in the *Archives of Internal Medicine*, Chicago.

posterior column. (*d*) In the posterior column run also for several segments the impulses subserving touch, pressure and localization. These, however, eventually find their way to and ascend in the anterior columns.

Thus the grey matter is not the seat of any continuous path, as was formerly thought. Many of the foregoing conclusions had been already advanced by Brown-Séquard until physiological experiments apparently contradicted them. They have, however, been reëstablished by more complete and less faulty clinical examinations, which we owe mainly to Head and his associates.

III. To these workers we owe the striking discovery that the sensory impulses before they reach the cord pass along the peripheral nerves in combinations very different from the foregoing. They are in three groups: (*a*) Those of deep sensibility, which proceed from bone, tendon, joint and connective tissue in general; as well as from muscle, where they are commingled with the motor nerves. They are stimulated by molecular deformation, and this stimulus when intense is painful. (*b*) Protopathic sensibility, carried by cutaneous nerves, consisting chiefly of the appreciation of extremes of heat and cold, of pain, and of vague touch. (*c*) The epicritic sense, ascertained by gentle stimulation of the skin by the very finest cotton wool, by temperatures between 22 C. and 47 C., by the power of localization, and by Weber's compass test.

IV. Among the many clinical types of sensory disability the most important from the practitioner's point of view is the hysterical; for, given the present inadequate knowledge on the part of the laity of normal and abnormal sensory distribution, it is always possible for the expert to detect this form of functional disability by its positive characters, which far exceed in importance any presumptions derived from history of the disease or the so-called "neuroticism" of the patient, this latter being indeed often an index of organic perturbation of the nervous system.

Where it is a question of hemianesthesia due to intracranial lesion, the differential characters are the following: (*a*) The hysterical anesthesiae of the present day (1) reach the mid-line exactly, (2) are absolute, (3) as a rule affect all segments equally. (*b*) When palsy is present, anaesthesia of the affected limb is no help. Variability is rather in favor of organic change than of hysterical fixed idea. The summation of stimuli rarely fails to leap

the barrier of an organically interrupted nerve path. Distribution in spots is more significant of tabes or other radicular affection than of hysteria. The implication of all the special senses, however, is strongly presumptive of hysteria, although this diagnosis by no means negatives the organic origin of one or several symptoms present, which are very likely to be the suggestive force at the root of the rest of the syndrome. (*c*) It is to the demonstration of its induction by suggestion, however, that we must refer the criterion of the hysterical nature of any anesthesia.

The examiner, knowing from the positive characters ascertained that the anesthesia before him cannot be organic, then seeks the suggestion at the root of the perturbation. This may be done (1) by a simple anamnesis, (2) by psycho-analysis, either by the association method or during hypnosis, or (3) by the effects of therapeutic suggestion.

V. Another important clinical type of sensory disability is the radicular. In this, the distribution of the anesthesia, hyperesthesia or dysesthesia is in an area corresponding with the spinal segments or radicular nerves. For its diagnosis it is essential to know the cutaneous area belonging to each of these and also the amount and nature of overlapping of contiguous radicular-nerve distribution. The epicritic elements of these overlap very widely, while the protopathic fibers do so much less. As this distinction is the opposite of that obtaining in peripheral nerves in the mass, it is easy to understand its diagnostic importance. Sciatica is often radicular in causation, and, when so, may be distinguished by the presence of the posterior primary division symptoms, the occurrence of pain upon sneezing or violent coughing, and the relative absence of the sign of Lesègue. It is important, however, to eliminate referred pain. This is done by its distribution, and by the drawing up of the opposite leg when a truly sciatic pain is investigated. The pains accompanying locomotor ataxia are of radicular origin.

VI. The dysesthesiae occurring in syringomyelia are too well known to demand space here; but those of the Brown-Séquard type were ill understood until studied with the greater precision made possible by Head. He has definitely shown the importance of distinguishing between remote and local interruptions in nerve paths by unilateral lesions of the spinal cord, and he has demon-

strated how differently are grouped deep touch and cutaneous touch in cord and peripheral nerve.

VII. A clinician who has not a knowledge of the distribution of referred pains is sadly handicapped as a diagnostician. The laws upon which this depends are referred by Mackenzie to the autonomic nervous system of Langley. The most familiar example of its influence is found in the arm pains of angina pectoris. In many respects the autonomic areas correspond to the distribution of protopathic nerves, and Head believes the systems to be identical. There are reasons against this, however; but for these the reader is referred to the writer's article in the *Archives of Internal Medicine* and to the writings of Mackenzie. It is possible that the "anguish neuroses" may be due to perturbations of the autonomic nervous system; and as this condition is often mistakenly diagnosed as hysteria, clinicians might learn much by investigating corresponding cutaneous areas while the patient is in an acute paroxysm of "angoisse;" for, as Lebar has shown, it is only during the acute phase of irritation that modifications of cutaneous areas may be found. The further knowledge of these points may solve many of the problems concerning the pathogenesis of certain insanities and bring further categories within our understanding as organic diseases of the nervous system, or as secondary manifestations of disease in other organs, thus once more unifying psychiatry with general pathology.

**Dr. Hickling** said that such a mass of evidence had been presented that he felt embarrassed in selecting a point of entrance for discussion. He was sorry that Head's terminology for the varieties of sensibility had not been consistently followed out. He himself was not ready to abandon the old divisions of pain, touch, temperature and muscular sense, which have been so abundantly tried by practical clinical experience, for a new and hypothetical classification.

A very practical demonstration has been of service to surgery, viz: that nerve fibers are everywhere alike, that their functions depend entirely upon their end organs and central nuclei. This fact has already been made use of for bridging over destroyed sections of nerves or for making one nerve trunk serve for another.

The confusion of sensory symptoms in destructive lesions of the cord has been explained by finding that some fibers ascend in Burdach's column, while others may be found in the tract of

Gowers. Only an extensive lesion of the cord would completely interrupt all sensory communications.

As to the faradic trap, is the iron core necessary in the coil in order to use this test? Dr. Williams had laid stress on Mankoff's trap; Dr. Hickling had had occasion to try it in 100 cases, and while the pulse rate did undoubtedly increase in the presence of pain, still in other cases the increase was noted without pain.

How do Head's ideas of sensibility help in the recognition of sciatica? The same story appears to be told, no matter what names are given to sensations.

Dr. Hickling did not agree with the statement that the parietal peritoneum is non-sensitive. He has tested this question in many cases, and no matter how carefully the area might be blocked or anesthetized, the parietal peritoneum was always sensitive; so far as he could observe the sensibility did not reside in the subperitoneal tissue.

He did not think that the origin of shock had been adequately explained—from the surgical standpoint, at any rate. He would dislike to believe that the conditions arise from psychic influences.

**Dr. Wm. A. White** said that the views put forth as to the sensorium were important and interesting; the studies of Head were the most careful and scientific experiments made in many years; the results cannot be characterized as theoretical, but must be regarded as practically settling the question.

In psychiatry the sensorium is most important to study. When we realize that all information from the outside must reach the mentality by the sensory apparatus we may appreciate how necessary it is to know how the sensorium is informing the mind. This matter is a particularly difficult one to study, but absolutely essential, especially as we know that so many cases of mental defect present also defects of the sensory apparatus; as, for example, in the anxiety neuroses or psychoses, it is easy to see that if sensory impressions are falsely reported to the mind erroneous psychical impressions may be created. Particularly apt to give rise to morbid fears and anxiety are the vague, indefinite protopathic sensations.

**Dr. Williams** said that Dr. Hickling had made the inadequacy of his exposition very evident; this was inevitable, however, in view of the limited time at his disposal. He wished to remove one misapprehension—not one of the considerations presented had been his own; he had wished only to focus attention upon the work of Déjerine, Head, Mackenzie and others.

He thanked Dr. White for his very clear elucidation of the effects of protopathic sensations in psychoses.

As to the comparative value of the two classifications of sensory impulses, Dr. Williams had endeavored to point out that

only in the periphery do the nerves possess the epicritic, protopathic and deep sensibility (of Head); thus we may differentiate between peripheral and cord lesions, because after the nerves enter the cord a redistribution of fibers takes place, so that sensory paths may then be classified in the way of the old clinicians—paths of touch, pain, heat, etc. The sense of touch is never lost in cord lesions unless the lesion be complete transverse, because there are two paths—anterior and posterior; touch may be lost, however, from either a peripheral or central lesion.

As to Dr. Hickling's inquiry, Head makes the statement that only when an iron core is placed in the primary coil is the painful epicritic sensibility excited by the faradic current.

His illustration of the adaptation of Head's varieties of sensibility to the study of sciatica did not contemplate the mere diagnosis of the condition, but it had a decided bearing upon treatment; it demonstrated the radicular origin of the lesion and of the pain, in which case the treatment would be essentially different from that of a peripheral sciatic neuritis.

With regard to the sensibility of the parietal peritoneum, his reference had been to Mackenzie's studies upon this question, although it must be said that Mackenzie is quite alone in his opinion that sensibility resides in the underlying connective tissue.

Dr. Williams did not wish to imply that shock is a psychic state; what he wished to convey was that shock may produce an erethism of the internal organs.

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## RESOLUTIONS UNANIMOUSLY ADOPTED BY THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, MARCH 25, 1908, IN MEMORY OF DR. ANNE A. WILSON.

On March 13, 1908, after a short illness, Dr. Anne Augusta Wilson entered into rest. For three months Dr. Wilson had known that she was suffering from *diabetes mellitus* in a mild form, but she was able to attend to a particularly heavy practice and was actively engaged in her work until within forty-eight hours of her death. On March 11th coma developed, which gradually deepened until death occurred.

Dr. Wilson was born in Baltimore, Md., September 20, 1857, received her medical education in the London Medical School for Women, and was granted the degrees of M. R. C. S. and L. R. C. P. from the Colleges of Glasgow and Edinburgh in 1892, and

the degree of Doctor of Medicine, with honors, from the University of Brussels in 1892.

She served as head physician of the Clapham Maternity Hospital, London, in 1892.

In the summer of 1893 she settled in this city. Largely through her efforts the Dorothea Dix Dispensary was opened. She served as a medical assistant at the Emergency Hospital and Central Dispensary, and for a number of years was on the staff of the National Florence Crittenton Home. She was also instrumental in establishing the Instructive Visiting Nurse Society, and continued until her death to be an active worker and a member of the Board of Managers thereof.

WHEREAS, In the death of Dr. Anne Augusta Wilson the medical profession of Washington has sustained a heavy loss; be it

*Resolved*, That the Medical Society of the District of Columbia expresses its deep appreciation of the work of its deceased member; of the ennobling influence of her personality upon all with whom she came in contact; of her untiring devotion to her profession, and of the exalted spirit which permeated all her dealings with her fellow men.

*Resolved*, That a copy of these resolutions be sent to the family of the deceased and be spread upon the minutes of this Society.

(Signed) SOPHIE A. NORDHOFF-JUNG,
ADA R. THOMAS,
EMMA LOOTZ ERVING,
*Committee.*

**Dr. I. S. Stone** said: "It seems but proper that we should on this occasion pay tribute to the worth of a colleague who has too early been called away from her beneficent work on earth to an eternal reward. Dr. Anne Wilson filled with many, the position of physician and friend. It was perhaps true that she worked too hard, was unmindful of her own interests while laboring for the welfare of others, for she was a philanthropist in the best sense of the word. It is a pleasure to recall how she succeeded in inspiring her patients with her own abundant flow of life and spirits, for she possessed an unusual amount of vivacity.

"Although an accurate and careful observer of the manifestations of disease, we believe that she modestly, although possibly unwisely, refrained from reporting or publishing many of her conclusions upon medical subjects. She was admirably equipped for

such work, and we regret that she did not leave a larger number of papers as a legacy to her friends and admirers, as well as to the medical profession in general. The paper upon 'Exophthalmic Goitre' read before this Society on May 15, 1907, must be awarded a high position as a contribution of value and scientific interest. The whole field was covered from a medical standpoint, yet so systematically and tersely that it might be considered a model of its kind.

"Dr. Wilson had made a study of this disease during her term of service in the Royal Free Hospital, London, in 1891, while under the instruction of Dr. Hector McKenzie. In her paper she called our attention to what has not been generally known, that goitre and even exophthalmos are not always present in Graves' disease. She especially mentioned the 'incomplete forms,' and reported a case which she was successfully treating with the 'Beebe-Rogers serum.'

"Personally speaking, we never heard Dr. Wilson criticize or impugn the motives of her fellow practitioners. She was always welcome in my own home, and was a highly-esteemed friend of my family, and on more than one occasion was consulted regarding the health of its members. Her temperament seemed to have been one of a most fortunate combination of quick perception, sound judgment, with broad and liberal education, yet with rare refinement and sentiment, for she was a most charming woman, as well as an accomplished physician. We approve of the sentiments of appreciation as proposed by the Committee and adopted by the Society, and we think we are ourselves honored in thus paying tribute to the memory of one of our most efficient and accomplished members."

**Dr. Kober** said: "It was my good fortune to know Dr. Wilson since 1895, and I can testify in the strongest manner possible to her professional and moral qualifications. We often speak with approval of self-made men—our lamented friend was a type of the self-made woman, and secured professional and social distinction by personal effort and merit alone. In her youth she was for several years the main support of her family, which task she accomplished by teaching. Her ambition to study medicine led her to educate one of her brothers, so that he might be able to assume the family cares. When this was accomplished, she entered upon the task of earning and saving sufficient funds to secure a medical education. How well she succeeded is shown by the fact that she received the degree of Doctor of Medicine *cum laude* from the University of Brussels, a distinction which few of us have attained. Her splendid professional career and high-grade literary work are sufficient evidence of her professional qualifications. Her interest in public-health questions was remarkable and far above the average of her professional brethren. I recall with great satisfaction her strenuous efforts to secure reliable information from foreign

countries concerning notification and quarantine in communicable diseases. In all such matters she displayed good judgment, knowledge and power.

" Dr. Wilson had a very arduous practice and was never free from family and financial cares: she worked hard that others might live upon her bounties. She was a typical charity worker, and one of her achievements was to assist in the organization of the Instructive Visiting Nurse Society in 1900, which has for its object to provide trained nurses to visit and nurse the poor in their homes, and to instruct them in the care of their sick under the direction of the Physicians to the Poor. This Society has now eight District Nurses; the work was conceived and is managed and wholly supported by a band of noble and intellectual women, and in my judgment is the most beneficent charity in this city. It is needless to say that Dr. Wilson, although embued with a profound charitable spirit, knew how to sift charity from abuse, and was therefore one of the most valuable and influential members of benevolent bodies.

" Mr. President, I feel that by the death of Dr. Wilson the Medical Society has lost one of its most distinguished members, and the community one of the most useful exponents of organized and well-directed charity work."

**Dr. Stavely** said that the uncertain tenure of human life was never more strikingly illustrated than by the sudden demise of Dr. Anne Wilson. Only forty-eight hours before the onset of her brief and fatal illness she had visited his office to confer about a patient and he had been struck by the vivacity of her bearing and the brilliance of her intellect. Two days later he learned with profound regret that she had passed away.

He had frequently been associated with Dr. Wilson in professional work and had numbered her among his most pleasant social acquaintances; he therefore felt it his duty and privilege to express thus publicly his appreciation of the value and excellence of her professional career and his sincere regret at the decease of an accomplished physician and a charming and gracious woman.

## PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

**Wednesday, April 1, 1908.**—The President, Dr. H. D. Fry, presided ; 55 members present.

The Treasurer presented his report for the month of March, showing : Receipts $5.00 and disbursements $134.05.

An invitation from Dr. Wm. A. White to the members of the Society to visit the Government Hospital for the Insane on the afternoon of Wednesday, April 15, was accepted.

The Treasurer asked instructions as to collecting the initiation fee from a candidate for membership who had formerly been a member of the Society, but had resigned and was now seeking readmission. He was instructed that the regular initiation fee should be collected.

An appropriation of $240.99 was made to pay bills of the Editorial Committee and Committee on History.

Dr. Prentiss Willson read a paper on "Snake Poisons." Discussed by Drs. Yarrow, T. C. Smith, E. L. Morgan, Kinyoun and Kober. See p. 265.

Dr. Butler read a review of Ophthalmology. Discussed by Drs. Polkinhorn, Yarrow, Kober, Macatee, Williams, O. Wilkinson, R. S. Lamb and Prentiss Willson.

The Society took a recess to 8 P. M., April 8.

**Adjourned Meeting, April 8.**—The President, Dr. Fry, presided.

The following candidates for membership were elected :

C. L. G. Anderson, College Physicians and Surgeons, N. Y., 1884.

Grant S. Barnhart, George Washington University, 1904.

Nelson Duval Brecht, George Washington University, 1906.

Edmund T. M. Franklin, George Washington University, 1905.

J. A. Gannon, Georgetown University, 1906.

Joseph M. Heller, Georgetown University, 1896.

Stanton W. Howard, Georgetown University, 1903.

Harry M. Kaufman, Johns Hopkins University, 1901.

Lyman F. Kebler, George Washington University, 1906.

Huron W. Lawson, George Washington University, 1903.

Edward M. Parker, University of the City of New York, 1884.

Elwin C. Schneider, Georgetown University, 1905.

John W. Sutherin, Howard University, 1902.

William H. Syme, George Washington University, 1904.

Hamilton Wright, McGill University, Montreal, 1895.

**Regular Meeting, April 8.**—The President, Dr. Fry, presided ; about 65 members present.

Dr. E. B. Behrend read a "Review of Bacteriology." Discussed by Dr. Kinyoun. See p. 209.

Dr. Williams read a paper on "The Importance of Modifications of the Sensibility in the Diagnosis of Disease, in the Light of Recent Neurological Investigations." Discussed by Drs. Hickling and Wm. A. White. See p. 277.

**Wednesday, April 15.**—The President, Dr. Fry, presided ; about about 65 members present.

An appropriation of $2.25 for photographs for the Committee on History was granted.

Dr. I. S. Stone read the essay for the evening, "Post-operative Ileus." Discussed by Drs. Winslow, Vaughan, Taylor, Hooe, Balloch and Taber Johnson. See p. 231.

**Wednesday, April 22.**—Dr. Fry, the president, presided ; about 50 members present.

Dr. G. Brown Miller read a "Review of Gynecology." Discussed by Drs. I. S. Stone, Sprigg and Hagner. See p. 217.

Dr. Roy read a paper entitled "The catalytic action of Lipase in relation to Acidosis." Discussed by Dr. Wall. See p. 243.

**Wednesday, April 29.**—The President Dr. Fry, presided ; about 175 members present.

In the absence of the Recording Secretary, Dr. Reichelderfer was appointed temporary Secretary.

Dr. J. Chalmers Da Costa, of Philadelphia, was introduced by the President, and addressed the Society upon "Fashion and custom in surgery." Discussed by Drs. A. F. A. King and Balloch. A rising vote of thanks was given Dr. Da Costa.

**Wednesday, May 6.**—The President, Dr. Fry, presided ; about 65 members present.

The Treasurer asked instructions as to granting authority for signing the Constitution by proxy, such permission having been requested by a recently elected candidate for membership. The Chair ruled that no time limit for signing the Constitution was provided by the Constitution, and that no reason for signing by proxy exists.

Mr. Bailey Willis addressed the Society in explanation of a proposed weekly publication to be issued by the Washington Academy of Sciences and to be participated in by the affiliated Societies. On motion of Dr. Kober, the question of participation by the Medical Society was referred to the Executive Committee for consideration and report.

Dr. Moran reported a case of Duodenal Ulcer, with specimen.

Discussed by Drs. D. S. Lamb, Williams, Gwynne and Barton. See p. 262.

Dr. G. W. Wood read an essay upon "The Syncytium; its functions and its relations to the toxemia of pregnancy." Discussed by Drs. Rosenau and Williams. See p. 247.


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EDITORIAL COMMITTEE.

D. S. LAMB, A. M., M. D., *Chairman*, . 2114 Eighteenth Street, N. W.
MURRAY GALT MOTTER, A. M., M. D., . . . 1841 Summit Place.


## Editorial.

REGISTRATION OF PHYSICIANS IN THE DISTRICT OF COLUMBIA. —The following bill was introduced into the U. S. Senate, May 5, 1908, by Senator Gallinger, and referred to the Committee on the District of Columbia (S. 6,976):

"A BILL to amend sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia,' be, and the same are hereby, amended so as to read as follows:

"SEC. 3. That from and after the passage of this Act all persons desiring to practice medicine and surgery in any of their branches, or to treat human ailments in the District of Columbia, shall apply to said board of medical supervisors for a license to do so. Applicants shall submit to examination upon the following-

named branches, to wit: Anatomy, physiology, chemistry, pathology, materia medica and therapeutics, hygiene, histology, practice of medicine, surgery, obstetrics and gynecology, diseases of the eye and the ear, medical jurisprudence, and such other branches as said board shall deem advisable. Each applicant shall be certified by said board for examination as speedily as possible to the board of medical examiners whose members are adherents to the system of medicine which said applicant desires to practice; but said board shall not certify for examination any applicant until satisfactory proof is furnished that he or she is of good moral character and over twenty-one years of age nor until he or she has presented at least a certificate or diploma issued after four years of study either in a normal, manual training, or high school of the first grade or in a legally constituted academy, seminary, or institute of equal grade or a student's certificate of examination for admission to the freshman class of a reputable literary college, or has received an academic education, considered and accepted by the superintendent of public instruction of the District as fully equivalent, and has either received a diploma conferring the degree of doctor of medicine from some legally incorporated medical college (which in the opinion of said board was in good standing at the time of issuing said diploma) in the United States, or a diploma or license conferring the full right to practice all the branches of medicine and surgery in some foreign country, and has also studied medicine not less than four full school years of at least nine months each, including four satisfactory courses of lectures of at least seven months each in four different calendar years in some legally incorporated American or foreign medical college or colleges prior to the granting of said diploma or foreign license: *Provided*, That said diploma, if issued prior to July first, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that said applicant has studied medicine and surgery for not less than three years prior to the issue thereof, and if issued subsequent to June thirtieth, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that the applicant has studied medicine and surgery for not less than four years prior to the issue of said diploma. All examinations shall be both theoretical and practical and of sufficient severity to test a candidate's fitness to practice medicine and surgery.'

"'SEC. 8. That if in the opinion of a majority of the board of medical supervisors, after a careful examination of the report of the board of medical examiners by which any applicant was examined, said applicant has fairly and successfully passed such examination as hereinbefore provided for, the board of medical supervisors of the District of Columbia shall, as soon thereafter as possible, issue to him a license signed by the president and the secretary of said board and attested by the seal of the District of Columbia, which license shall entitle said applicant, after it is

registered as hereinafter provided, to practice medicine and surgery in the District of Columbia: *Provided*, That a license shall be issued upon application, free of cost and without examination, to each physician who is registered at the health office of the District of Columbia at the time of the passage of this Act, and to physicians who may change their residence to the District of Columbia from any State or Territory where medical laws and medical examining boards exist, the presentation of a certificate or license from a medical examining board, if found upon due inquiry to be true and genuine, being sufficient evidence of right to registration and certification under the provisions of this Act: *Provided*, That the medical laws and examining boards of such States and Territories, whose requirements are equal to those of the District of Columbia, grant equal rights and recognition to the licentiates of the board herein created. All licenses issued by said board shall be numbered consecutively, and a register shall be kept by the secretary showing the number of each license, the date of issue, and to whom issued.'

"'Sec. 13. That from and after the passage of this Act any person practicing medicine and surgery, midwifery, or treating human ailments in the District of Columbia, or who shall publicly profess to do so, without first having obtained from the Board of Medical Supervisors of the District of Columbia a license and registered the same as herein provided, or in violation of any of the provisions of this Act or any of the rules and regulations made by authority conferred herein, or after his license or registration has been canceled by order of said board of medical supervisors of the District of Columbia, shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished for each offense by a fine of not less than fifty nor more than five hundred dollars, or by imprisonment in the District jail for a period of not less than ten nor more than ninety days, or by both such fine and imprisonment. It shall be the duty of the United States district attorney for the District of Columbia to prosecute all violations of the provisions of this Act.'"

It would seem that a law such as that of New York or Texas, which provides for a *single* examining board and omits from the examination the subjects of materia medica, therapeutics and practice of medicine, and requires only that the candidate shall have a sufficient knowledge of anatomy, physiology, chemistry, bacteriology, pathology, surgery, gynecology, &c., would be better, permitting the physician to practice on any theory he chooses, which, indeed, he will do anyhow.

We think that this bill needs careful consideration. A number of questions arise; for instance, in section 3, is a requirement

that the medical school from which the candidate has graduated must have a course of "four full school years of at least *nine* months each." The italics are ours. How many, or rather, how few medical schools in the United States have a "full school year of nine months?"

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The International Tuberculosis Congress.—This Congress will meet in this city September 21 to October 12, 1908. Its organization has been entrusted to the "National Association for the Study and Prevention of Tuberculosis." The Secretary of the Committee on the Congress is Dr. Joseph Walsh, of Philadelphia, and this Committee has appointed as Secretary General of the Congress Dr. John S. Fulton, 714 Colorado Building, Washington, D. C.

The Congress will be divided into seven sections, as follows:

1st. Pathology and bacteriology; the secretaries are Drs. H. C. Ernst, of Boston, and W. R. Stokes, of Baltimore.

2d. Clinical study and therapy of tuberculosis; sanatoria, hospitals and dispensaries; secretaries, Drs. E. A. Locke, Boston; W. J. Barlow, Los Angeles, and G. Bourgeois, Paris, France.

3d. Surgery and orthopedics; Drs. W. D. Haggard, Nashville, Tenn., and J. T. Bottomley, Boston.

4th. Tuberculosis in children; etiology, prevention and treatment; Drs. David Bovaird, Jr., New York City, and F. S. Churchill, Chicago.

5th. Hygiene; social and economic aspects of tuberculosis; Mr. A. M. Wilson, Chicago, and Miss Lillian Brandt, New York City.

6th. State and municipal control of tuberculosis; Dr. J. W. Kerr, Washington, D. C.

7th. Tuberculosis in animals and its relation to man; Dr. J. R. Mohler, Washington, D. C.

The section work will be done in the week September 28 to October 3, and during this week there will be two general meetings. There will be a tuberculosis exhibition from September 21 to October 12, accompanied by special lectures, clinics and demonstrations. A number of prizes are offered. The proceedings will be published. Active members pay a fee of $5.00, associate members $2.00. A provisional itinerary has been arranged.

The Group Half-Tones.—Several members of the Society who have seen the group half-tones of members, that have already been made, have expressed a desire to obtain one or more copies of certain groups, when the time comes for printing—a time that, from present appearances, will not long be deferred. The Committee on History will be pleased to furnish such copies at cost price to those who send their names to the Chairman of the Committee, stating how many copies they want and of which groups. The half-tones can be seen at the residence of the Chairman, 2114 18th Street, N. W. Some groups are still in the hands of the engraver and some have not been made up because the photographs have not yet been received.

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## Publications Received.

Cocks and MacKenty, "Headaches caused by pathologic conditions of the nose and the accessory sinuses."

H. E. McKnower, "Some influences favoring the development of the *American Journal of Anatomy* and the *Anatomical Record*." Reprint, 1908.

L. D. Bulkley, "The value of an absolutely vegetarian diet in psoriasis." Reprint.

Transactions of the American Pediatric Society for 1907.

"Standardization of tetanus antitoxin," Hygienic Laboratory, Bulletin 43, 1908.

Bulletin 40, Hygienic Laboratory, May, 1908, comprising papers by Stiles and Goldberger on: 1st, "The occurrence of a proliferating cestode larva in a man in Florida;" 2d, "Reëxamination of a type specimen of *filaria restiformis* of Leidy, 1880;" 3d, "Observations on two new parasitic trematodes;" and 4th, "Reëxamination of the original specimen of taenia saginata, Abietina."

"Documents in the matter of quarantine against yellow fever in Cuba," *American Health*, 1908.

H. D. Fry, "Management of labor in minor degrees of pelvic contraction." Reprint.

Bulletin of the State University, Lexington, Ky., April, 1908, "Chronology and order of ossification of the bones of the carpus," by J. W. Pryor.

Mortality statistics, 1906 ; Seventh annual report of the Bureau of the Census.

"Members of the St. Louis Medical Society, etc., who are advertised in saloons or newspapers." Reprint.

J. M. Taylor, "The hand as a therapeutic agent;" "The future of medicine;" "Utility of saline solutions in treatment of fever." Reprints.

Bulletin of Northwestern University, Chicago, March, 1908.

U. S. Naval Bulletin, April, 1908.

Bulletin 42, U. S. P. H. and M. H. S.; M. J. Rosenau, "Thermal death point of pathogenic organisms in milk."

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## Exchanges.

*Annals Gynecology and Pediatrics.*
*Buffalo Medical Journal.*
*Colorado Medicine.*
*Cronica Medica Mexicana.*
*Illinois Medical Bulletin.*
*Journal Kansas Medical Society.*
*Journal Medical Society New Jersey.*
*Journal Michigan Medical Society.*
*Louisville Monthly Journal Medicine and Surgery.*
*Maryland Medical Journal.*
*Modern Medicine.*
*New York State Journal Medicine.*
*Northwest Medicine.*
*Pacific Medical Journal.*
*Proctologist.*
*Providence Medical Journal.*
*Texas State Journal Medicine.*
*West Virginia Medical Journal.*

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The George Washington University.—The graduating class of the Department of Medicine, numbering forty-five, who received the degree of Doctor of Medicine at the commencement exercises, June 3, 1908, has announced to the University authorities the establishment by the class of a research fellowship. This fellowship will be known as the "Class of '08 Fellowship," and will have an annual fund of not less than $300.

COMPLIMENTARY BANQUET TO GENERAL GEORGE M. STERNBERG.—A banquet was given to Dr. Sternberg, Surgeon General, U. S. A., retired, on the occasion of his 70th birthday, on the evening of June 8, 1908, at Rauscher's. It was well attended especially by the medical profession. As a good account of it was published in the daily papers and a full one will be printed, this brief statement will suffice. Hon. J. W. Foster presided and was toastmaster. The following toasts were given: 1st, "General Sternberg as physician and surgeon," by Dr. W. D. McCaw, Major and Surgeon, U. S. A.; 2d, "As a scientist," by Dr. Geo. M. Kober; 3d, "As philanthropist," by Mr. Justice Brewer; 4th, "As a citizen," by Hon. H. B. F. Macfarland; 5th, "Our Guest," by Hon. Simon Wolf, who presented the loving cup. To all of which General Sternberg appropriately responded.

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DR. FLORENCE DONOHUE, a member of this Society, died at his residence June 24, 1908. A further notice will appear in a future number of the ANNALS.

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THE FOLLOWING LETTER has been received from the Pasteur Vaccine Company, Ltd:

"NEW YORK, *June 6, 1908.*

"WASHINGTON MEDICAL ANNALS, Washington, D. C.

"Gentlemen: In connection with the wide-spread and increasing interest throughout the civilized world in the matter of the prevention and cure of tuberculosis you will be interested to learn that Prof. Marmorek, the discoverer of antistreptococcic serum, at the Institut Pasteur, Paris, has signified his willingness, at the request of our Paris house, to supply physicians who are especially known through their work in connection with tuberculosis with a certain amount of his tuberculosis serum for clinical tests gratis. Such physicians, if they will communicate with us, we will immediately place in touch with Prof. Marmorek through our Paris house.

"We should be pleased to supply, for clinical experiments in your wards for contagious diseases, a sufficient amount of a new scarlet fever serum for internal administration gratis.

"Yours very truly, PASTEUR VACCINE CO., LTD."

The New Tuberculosis Hospital.—This hospital is for indigent patients and is under the control of the Board of Charities. It is situated on Varnum street, n. w., about on a line with 13th street, and is reached by either the 14th street or Brightwood Avenue cars; the former for pedestrians, the latter for vehicles. Dr. Percy G. Smith is the superintendent and Dr. Pearson, assistant. The hospital building was opened for public inspection June 26th, and was visited by quite a number of physicians. The building is up-to-date and reflects great credit upon those who planned it. It is well worth a visit.

## Medical Miscellany.

**The Edward N. Gibbs Memorial Prize, $1,000.00.**—Subject: The Etiology, Pathology and Treatment of the Diseases of the Kidney.—The New York Academy of Medicine announces that the sum of $1,000.00 will be awarded to the author of the best essay in competition for the above mentioned prize. Essays must be presented on or before October first, 1909. The three subjects mentioned in the title need not be treated with uniform fulness, but new discovery or fruitful research will be considered the standard of merit. Each essay must be in English, typewritten, designated by a motto or device, and accompanied by a sealed envelope bearing the same motto or device, which shall contain the name and address of the author. No envelope will be opened except that which accompanies the successful essay. The Academy reserves the right, according to the direction of the donors, not to award the prize if no essay shall be deemed worthy of it. The Academy will return the unsuccessful essays, if claimed by their respective authors, or by authorized agents, within six months. An essay must show originality in order to obtain the prize. The competition is open to members of the regular medical profession of the United States. The successful essay shall be the property of the Academy, and, according to the deed of gift, will be published in its Transactions. Essays should be transmitted to the "Committee of the New York Academy of Medicine on the Edward N. Gibbs Memorial Prize."

**Physicians Who Permit Themselves to be Advertised in the Newspapers, &c.**—Dr. Clarence Martin, editor of the *Medical Era*, St. Louis, Mo., sends a reprint of an editorial of June, 1908, entitled "Members of the St. Louis Medical Society

and of the American Medical Association who are advertised in Saloons and Newspapers; with presentation of evidence," in which he calls attention to the fact that certain physicians, giving their names and detailing the circumstances, are permitting themselves to be advertised in what are called "display" advertisements in the newspapers and by posters in saloons.

Vol. VII. SEPTEMBER, 1908. No. 4.

# WASHINGTON MEDICAL ANNALS

## CLASSIFICATION OF INSANITY.*

By D. P. HICKLING, M. D.,

Washington, D. C.

There has long been a need for a recognized uniformity in the classification of insanity, not only for the purpose of diagnosis, prognosis and treatment, but for intelligent understanding and discussion. It is not infrequent that three medical men will, while in court, and under oath, give three different names to describe the mental condition of the alleged lunatic, and it is the exception when all the physicians in a given case of lunacy agree on the same diagnosis. This is certainly unfortunate, and cannot fail to bring discredit on all physicians concerned.

For years the chance of improving this condition of affairs seemed hopeless; the lack of a pathological basis and the failure of bacteriology to help the situation were disappointing, while the words melancholia, monomania, delusional insanity, dementia and the many adjectives which were added to the word mania were so tempting that the merest tyro could and would give a name to any mental state that the patient would present. The only perplexing part was that the patient would not stay in the diagnostic box in which he was placed. The religious mania of Dr. Tom would be the melancholia of Dr. Dick and the monomania or dementia of Dr. Harry, and when these three gentlemen would get together, is it any wonder that their practical experience did not contribute to the advancement of the knowledge of mental diseases? In addition to the above the temptation of some to lay great stress upon the period of life at which the insane condition developed, such as puberty, adolescence, the puerperium,

* Read before the Medical Society, May 27, 1908.

menopause and senility, as well as the dyscrasiae due to the epilepsies, alcoholism, trauma, degeneracy, toxemia and exhaustion, and the attempts to classify the different kinds of delusions and hallucinations, the situation became extremely confused ; and in addition to all this there seemed to be an innate desire on the part of nearly every writer on psychiatry to form a classification of his own, so that the situation was almost helpless.

In the many attempts to bring order out of chaos the work of Emil Kraepelin, of Heidelberg, stands out in bold relief, while the work of Defendorf, of Yale, and Wm. A. White, of our own Society, has elaborated the subject so well that in my judgment much would be gained if all should follow the classification of Kraepelin and use it in their daily work. In order to appreciate more clearly the advantage of Kraepelin's classification let us look for a moment at the very practical theory given by White in his "Outlines of Psychiatry," of the working of the normal mind. He states that "The functions of the highest nerve centers of the cerebral cortex constitute the physical basis of the mind and regulate and control the actions of the individual so as to best serve his interest in his relations with his environments. In order to do this the mind must obtain knowledge of the environment through the sense organs, assimilate this knowledge, and then act in accordance with it. In order to do this three things are necessary : first, a knowlege of the environment must be gained ; second, this knowledge must be associated and brought in relation with previous experiences ; third, it must be transformed into appropriate action. The sensorium subserves the first of these functions, the intellect the second, the motorium the third. The function of the sensorium is perception, of the intellect thinking, and of the motorium volition." It will thus be seen that any disturbance of these three, or any one of them, or if they fail to work together in harmony, the condition called insanity will probably be the result ; so with this scheme clearly in mind it will not be difficult in a large number of cases to tell whether a person is sane or insane. This is especially true when we eliminate from our classification the delirium of pneumonia, typhoid, nephritis, alcoholism and the infective toxemias, as well as obsessions and the so-called phrenasthenias or borderland cases, including psychoneurosis, hysteria, hypochondriasis, idiocy, imbecility, the terminal dementias and the mental states due to

morphine and cocaine. It is true that many of these conditions often present for the time being such symptoms that the expert must apply most carefully all his resources to determine the proper status of the cases ; a detailed consideration of them in this paper would far exceed the time allowed.

What I desire to call especial attention to at this time is a brief consideration of Kraepelin's classification of the forms of insanity known as melancholia, mania-depressive insanity, dementia precox, general paralysis, paranoia. These forms of insanity are all characterized by delusions, and have been almost entirely rearranged by Kraepelin. While he has retained, with the exception of mania-depressive insanity, the old familiar names, he tells us to lay but little stress upon the form and character of the delusion or hallucination which changes so frequently without any important significance, and teaches us to look deeper for less prominent, but more important and more constant symptoms which are present in the most diverse forms of the same disease and which reveal the nature of the underlying malady.

In general paresis Kraepelin lays no stress on the expansive delusions, but calls attention to the fact that delusions of any kind may exist ; he bases the diagnosis, however, upon the physical symptoms of unequal pupils, ptosis and the Argyll-Robertson pupil, the frequent disappearance of the labio-nasal fold, the tremulous tongue, the changed knee-jerks, the general anesthesia of the skin, the ataxia, the "Romberg," the almost characteristic speech, the bladder symptoms, and the difficulty of writing and figuring ; these should be looked for in all cases of insanity, and either found or excluded before a diagnosis is made. The senseless delusions, the extraordinary behavior, the poor sleep and the feeble mindedness which are often found, resemble somewhat mania-depressive insanity, dementia precox, melancholia, hypochondriasis, and even neurasthenia, so that a diagnosis without physical symptoms should never be made.

Paranoia, instead of indicating all forms of monomania and delusional insanity, should be restricted to those very few cases of progressive systematized insanity in which the comprehension, memory and outward bearings are normal, with a delusional view of the world, over self appreciation, ideas of grievances, delusions of being wronged ; all of the patients' troubles due to one cause, and in spite of failures he has great confidence in himself and

exalted self esteem. All these symptoms form a picture, although rare, too plain to be overlooked.

The circular insanities have been elaborated by Kraepelin's researches so that many of the manias and melancholias are now classed under the suggestive head of mania-depressive insanity. This is an important classification that permits of a prognosis which is favorable, although relapses are apt to occur. The conditions of depression and excitement, whether occurring separately, together, or alternating, serve to strengthen the diagnosis rather than to confuse. In the depressed stage the emotional depression with its impediment of thought and will and peculiar history should not be confused with the apprehensive depression existing without an external cause, which is always found in true melancholia ; while the excited stage, with flight of ideas, the senseless statements, the exalted and joyous mood, and the inability to obtain short and concise answers to questions, with ideas springing up unhindered only to be driven out by something new, with actions running without restraint, and the history of previous attacks and depressions make the diagnosis clear. The peculiar characteristics of alcoholic mania, with which this condition is apt to be confused, with its sudden onset, alcoholic history, fantastic delusions, with its vivid auditory and visual delusions, should cause no difficulty when kept in mind. The mixed conditions of mania-depressive insanity, the so-called maniacal stupor, where the patient is cheerful, but irritable, with a hazy appreciation of his position, being unable to give connected information, promptly reacting at times to impression and influences, his admiration for himself with impediment of thought and will, easily diverted, with delusions, a history of recurrent attacks, of excitement and depression, and an absence of physical symptoms, make up this form of insanity. It will be seen, however, that there are a number of points suggesting several other forms of insanity, but there are strong diagnostic points of difference in each which prevent a mistake. The condition of melancholia, which was formerly one of the most prevalent upon the registers of insane institutions, is now one of the most rare, being limited to the apprehensive depression without exciting cause, of gradual development, lasting for months, with increasing severity and associated with delusions more or less fully developed. These patients are always apprehensive of danger which might occur, with

tormenting ideas and mental unrest, and present a picture found almost exclusively at the beginning of old age and which may be expected to give a favorable prognosis in about 33 per cent. of the cases.

Dementia precox embraces several forms of insanity variously described by different writers, and includes primary dementia and hebephrenia, and is a condition in which the patient understands and remembers, but does not react to impressions; in fact, a mental and emotional weakness. Upon this basis, with our improved methods of examination it is found that by far the largest number of the insane admitted to our institutions come under this head. The characteristic symptoms are a silly, vacant laugh which is constantly found, a fine muscular twitching around nose and mouth, a senseless playing with syllables and words and a peculiar method of shaking hands which lacks the grasp, to which have been added a number of physical symptoms such as increase of the deep reflexes, increased irritability of muscles and nerves, lessened sensation of pain, the pupils dilated or may be unequal, hippus may be present, anesthesia of the cornea, contracted visual fields, negative psychic, sensory and Piltz reflexes and a peculiar appearance of the fundus, showing dilated veins, contracted arteries, blurring or pallor of the discs, with a congestion of the nasal side; these eye symptoms are now said to be constant. The vaso-motor disturbances commonly found are dermographia, excessive sweating, secretion of aliva, rapid heart action, subnormal temperature, anemia, insomnia, loss of weight and a diffuse enlargement of the glands.

Cases of dementia precox, while having the above symptoms in common, present such a variety of general appearances that nearly all authorities, including Kraepelin, make subdivisions, such as the katatonic forms of stupor and excitement where negativism and stereotypism are found, and a paranoid form where the delusions are systematized.

It is sincerely hoped by calling attention in this hurried manner to the points that Kraepelin and his followers regard as important, that a classification which is thoroughly practical and scientific may be made and followed by the general practitioner as well as the specialist, so that confusion may be avoided and they may meet on the same ground and together obtain the best results.

**Dr. Wm. A. White** said that the classification of insanity in the past had been entirely hopeless and constituted the *pons asinorum* for every psychiatrist. Dr. Hickling was to be congratulated upon the succinct way in which he had presented the problem. Kraepelin was undoubtedly the first to teach a generally acceptable classification. He was the first to recognize that insanity must be studied from the standpoint of the life history of the insane individual; from the standpoint of origin, development and outcome.

Psychoses thus studied fell naturally into several groups, as had been set out by Dr. Hickling; but there remain vague borderline cases difficult to diagnose. Since the last edition of Kraepelin's work still greater refinement has become desirable.

It is always best to study a case from the standpoint of "What manner of man is this? What is his type, what his character?" than to attempt to label a disease and put the man into that jar whether he fit or not.

**Dr. Williams** wished to add an appreciation of Dr. White's recent book upon the subject under discussion. Dr. Williams asked consideration of the toxic infective psychoses, for example, the alcoholic psychoses, and called attention to the fact that they vary with the varying effect of the toxic agent upon different types of character, and also according to the amount of the toxic agent consumed and the time of consumption. All medical men are familiar with delirium tremens, raptus, etc. As many of the psychoses less well known belong to this general class, toxi-infectious psychoses, he urged that general practitioners familiarize themselves with the symptoms and course of these disturbances.

**Dr. Wilbur** suggested that the paper and discussion were peculiarly timely on account of the current movement of the American Medical Association to organize a better nomenclature and classification of mental diseases. The American Medical Association was the first body to respond to the appeal of the American Psychological Association for such a movement. He asked that general use be made of the terminology promulgated through these agencies.

**Dr. Hickling** expressed appreciation of the discussion of his paper. He himself at first had great difficulty in giving up the old classification, but had finally seen a great light through the work of Kraepelin. He called attention to a recent work, published in the *Journal American Medical Association*, upon the eye symptoms in one hundred cases of dementia precox.

# CASE OF TUBERCULOUS INTESTINE; RESECTION.*

By I. S. STONE, M. D.,

Washington, D. C.

Dr. Stone presented a specimen of ileum and caecum which had been removed from a female patient for the relief of bowel obstruction due to tubercular disease, with the following history:

The patient was a young married woman with children, who had an operation two years previously for the same cause. At the time of the first operation we observed marked emaciation and anemia with slowly acquired bowel obstruction. When the abdomen was opened the peritoneum was found studded with tubercles, and we called it universal tuberculosis of the peritoneum, or tubercular peritonitis. We saw but little evidence of mesenteric involvement. In the ileum we found a stenosis, which still may be seen in the specimen, and this was left in position on account of the poor condition of the patient. We thought best to relieve the immediate danger and trust to an improved condition of health for the relief of the tubercular disease. Accordingly an anastomosis was done, which cut out of circulation about twelve inches of the ileum, as here shown. The patient promptly recovered and made such rapid progress toward recovery as to make her physician, Dr. Corley, hope for a perfect operative result and a permanent cure. She gained at least twenty-five pounds, which for a small woman showed a surprising improvement in appearance and physique. But after nearly two years of excellent health we were again called to operate for intestinal obstruction, which was done at Sibley Hospital in April, 1908. The bowel was somewhat adherent under the former incision, in other words the caecum was adherent to the abdominal wall where we had made the anastomosis to the caecum just above the normal attachment of the ileum to the caecum. There was extensive involvement of the mesenteric glands, and we were able to announce marked improvement in the appearance of the peritoneum. The obstruction this last time is due to tubercular thickening of the whole caecum. The excision caused but little shock and the patient promptly recovered from the operation.

* Reported with specimen to the Medical Society, May 13, 1908.

**Dr. Vaughan** had not had many cases of tuberculosis of the intestine treated by anastomosis. One man, 23 years old, had tubercular masses involving the caecum and part of the ileum; this portion of the intestinal canal was removed and end-to-end anastomosis done. He recovered, and enjoyed good health for two years, but is now going down hill with symptoms of mesenteric gland involvement, as in Dr. Stone's case. This is the usual history.

**Dr. Balloch** said that the technic used by Dr. Stone impressed him, as other cases had done, with the value of incomplete operation. The anastomosis without resection gives a much better chance for recovery; resection can then be done later with much less danger. One such case operated on by himself had lived for three years, but finally died from mesenteric gland involvement.

**Dr. Jos. Taber Johnson** spoke of those cases of tubercular peritonitis with numerous tubercles scattered over the entire peritoneal surface, and with much effusion of fluid, which are benefitted by merely opening the abdomen and draining off the fluid. How may this be explained? There is a great temptation to interfere with the intestines matted together by adhesions in these cases; when the temptation is resisted the patient will usually do well.

**Dr. Stone** could not explain the improvement which follows opening a tuberculous peritoneal cavity, but surgeons lean to the idea that some mild infection of another type may be introduced which does good. He called attention to the fact that some cases, such as the one presented by him, look very formidable at first; but the operation has been done very often here and has usually helped greatly to prolong life. It is often difficult to decide in such cases whether the condition is tuberculous or malignant.

## THE EFFECT OF SURGICAL TREATMENT ON THE FATALITY FROM APPENDICITIS.

(Abstract.)*

By FRANK P. VALE, M. D.,

Washington, D. C.

The words mortality and fatality are generally employed synonymously, but the former may be restricted to frequency of death per unit of population and the latter per unit of sick. Mortality statistics are compiled by governments from certificates of death furnished by physicians; with a given fatality the mor-

*Read before the Medical Society, May 27, 1908.

tality of a disease will vary with the morbidity. Fatality is an index of the success of treatment, two important factors being the severity of the disease and the resisting powers of the patient. Morbidity is influenced by endemic, epidemic and psychological factors, concerning which we have but meager information.

The enormous increase in appendicitis is a matter of lay comment; the various factors contributory thereto could not be discussed in a short paper. A psychological element was suggested by such news items as the following, from the lay press: "Appendicitis Epidemic.—Temple, Tex., May 1.—An epidemic of appendicitis has prevailed here during the last two weeks. In that time there have been more than fifty persons operated upon and many others were afflicted who did not take the operation."

An inquiry into the effect of surgical treatment on the fatality from appendicitis places on trial a large amout of operating—about one operation in ten in this country, since 1890, has been on account of this useless appendage of the digestive tract. Statistics compiled by the writer, and quoted, showing the fatality of the disease in large series of cases since 1870, could speak for themselves; his own conclusion was that with the inauguration of the present operative era in its treatment, the fatality was increased before 1900 and later subsided to its point of departure —that is, when sum-totals are considered.

**Dr. Williams** called attention to the psychological factor in the etiology of pseudo-appendicitis. How do we know that all cases medically treated really have appendicitis? In view of the fact that epidemics of the disease occur, the statistics of medically treated cases should be corrected for this feature.

**Dr. Jack** said he would like to take exception to the dictum of Deaver that cases of appendicitis in collapse should not be operated upon; because in four cases brought to the hospital in collapse, cold to the waist, he had operated at once with scarcely any preparation and with three recoveries. He believes that all cases should be operated upon at once, and the earlier the better.

**Dr. Wellington** said that Dr. Vale deserved great credit for the laborious and painstaking compilation of statistics presented in his paper; at the same time Dr. Wellington did not think it fair to compare the statistics of medically and surgically treated cases of appendicitis—there was too much uncertainty in comparing the seen with the unseen. He agreed with Dr. Jack as to the need of immediate operation in all cases.

**Dr. Wood** said that for entire fairness in comparison, from the

medical standpoint, he would require the consideration of statistics of the cases operated upon in which there was no appendicitis at all. In his own practice he had had but two cases operated upon, in one of which there was no disease of the appendix.

**Dr. Randolph** said that no doubt Dr. Vale had taken into consideration the difficulty of drawing accurate conclusions from statistics. Perhaps he had seen in his examination of the literature the published answers to a circular letter asking for the opinions of eminent physicians and surgeons upon the comparative results of medical and surgical treatment of appendicitis. The consensus of opinion was that a very large percentage of the cases would recover under the expectant treatment; but that the probability of a final surgical attack is very great, thus making in one individual three or four medical recoveries to one surgical recovery, or, in the event of a fatal issue, one surgical death.

**Dr. Hickling** endorsed Dr. Randolph's statement of the case; medical recoveries do very frequently end in surgical death, and the likelihood of the fatal ending when finally coming into the surgeon's hands is increased both by the lesions remaining from earlier attacks and by the long delay in seeking surgical intervention fostered by the happy outcome of other illnesses.

**Dr. Hagner** said that while a few cases have been operated on in which the disease did not exist, such cases have been very few indeed. On the other hand, for the few operated on too soon there are very many operated on too late. He agreed with Dr. Jack that the patient should be given the benefit of the doubt, and the earlier the operation is done the better.

**Dr. Chappell** said he did not think Dr. Vale had proved his case. Dr. Vale should have compared the figures of the preoperative period with those of the operative. Another factor to be considered was the frequent inaccuracy of diagnosis in the preoperative period. Dr. Chappell does not believe that the mortality from appendicitis has not been lowered. To get at a true statement of the case there should be a comparison between the mortality and morbidity and the total population. A factor in swelling the mortality of surgically-treated appendicitis is the readiness of surgeons without the requisite experience to undertake the operation.

**Dr. Barnes** called attention to the diagnostic points pointed out by Morris, of New York, and now called Morris' points. To the right and left of the umbilicus, at the distance of about one inch, are two points where, upon pressure, tenderness may be elicited in certain intraabdominal conditions; these points correspond to the position of the underlying right and left lumbar ganglia of the sympathetic system. In appendicitis there may be found tenderness over the right point in cases in which no tenderness may be elicited at McBurney's point; there will be no tenderness over the left point. In obscure painful abdominal

affections, if both points are tender the lesions will be found in the pelvis; if neither point is tender the lesion will be found above the navel. He called attention, also, to what is known as the Morris appendix, apparently normal, but the seat of fibrous degeneration.

**Dr. E. L. Morgan** said the difficulty about waiting to call in the surgeon in appendicitis is to know how long to wait. In a case in his own practice, he had employed the expectant plan for a week with no improvement of the patient; he had then called in a surgeon who counseled further delay, with still no improvement; at the operation the abdomen was found full of pus. How can we know when we have waited too long?

**Dr. Kober** said that there could be no doubt that the low mortality in statistics of the preoperative period was due to the fact that the cases were not recognized. In the statistics of the German army medical reports, returns for death from peritonitis and intestinal perforation steadily decreased as the returns for appendicitis increased.

**Dr. Prentiss Willson** said that the objection had been raised that the figures should contain cases operated upon in which no evidence of appendicitis could be found; this objection very clearly sets out the fact that cases occur which so closely simulate appendicitis that operative intervention is warranted, and thus strongly confirms the opinion that many cases claimed as medical recoveries were not appendicitis at all.

**Dr. Vale** said that he could state his own position in the debate by saying that if he had appendicitis and had not improved in thirty-six hours, he would want the offender removed without delay. He had not been able to draw any conclusions from the figures collected, but had simply reported the results obtained by an examination of the literature to the present date. The substance of the results of the inquiry was that the fatality from appendicitis under surgical treatment prior to 1890 was too high; that for some unaccountable reason it increased after 1890, and has now fallen back to its original position.

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# REPORT OF TEN CASES OF EPIDEMIC CEREBRO-SPINAL MENINGITIS TREATED WITH THE ANTIMENINGITIS SERUM.

(Abstract.)*

JAMES DUDLEY MORGAN, A. B., M. D., AND W. W. WILKINSON, M. D.,

Washington, D. C.

November 17, 1907, there was admitted to the Garfield Memorial Hospital, Washington, a case of epidemic cerebro-spinal meningitis, which died seven days later, and was reported by one of us (Morgan) to the Society November 27. This case, while not treated with it, led us to secure Flexner's antimeningitis serum and use it in the ten cases presented in this report.

CASE I.—Female ; white ; age 18 ; tenth day of disease ; twelve lumbar punctures ; 165 c.c. of serum injected ; duration fifty-eight days. Complication : Parotitis ; cystitis ; choroiditis ; arthritis. Sequela : Blindness of right eye. Result : Recovery.

CASE II.—Male ; colored ; age 5 months ; forty-ninth day of disease ; five lumbar punctures ; 30 c.c. of serum injected ; duration sixty-two days. Chronic hydrocephalus on admission to hospital. Result : Died.

CASE III.—Male; white; age 4 years; seventh day of disease; three lumbar punctures; 30 c.c. of serum injected; duration twenty-one days. No complications or sequelae. Result : Recovery.

CASE IV.—Female ; white ; age, 6 years ; fourth day of disease ; one lumbar puncture ; 15 c.c. of serum injected ; duration nineteen days. Complication : Paralysis of auditory nerves. Sequela : Deafness in both ears. Result : Recovery.

CASE V.—Male ; colored ; age, 25 years ; eighth day of disease ; two lumbar punctures ; 20 c.c. of serum injected ; duration forty days. Complications : None. Sequela : Impaired mentality. Result : Recovered.

CASE VI.—Male ; colored ; age, 16 years ; thirty-fourth day of disease ; two lumbar punctures ; 15 c.c. of serum injected ; duration, forty-nine days. Complications : None. Sequelae : None. Result : Recovery.

CASE VII.—Male ; colored ; age, 39 ; fourth day of disease ; six lumbar punctures ; 105 c.c. of serum injected ; duration

* Read before the Medical Society, May 27, 1908.

twenty-five days. Complications: Pneumonia and dilatation of heart. Result: Died. Autopsy.

Case VIII.—Male; colored; age, 3 years; eighth day of disease; two lumbar punctures; 15 c.c. of serum injected; duration, nineteen days. Complications: None. Sequelae: None. Result: Recovered.

Case IX.—Male; white; age, 17 years; fourteenth day of disease; twelve lumbar punctures; 142.5 c.c. of serum injected; duration, thirty-five days. Complication: Suppurative parotitis. Sequelae: None. Result: Recovery.

Case X.—Male; white; 23 years of age; fourth day of disease; two lumbar punctures; 45 c.c of serum injected; duration, eight days. Complications: Pneumonia; intestinal paralysis. Result: Died.

Of the ten cases reported, seven recovered and three died, giving a mortality of 30 per cent. Omitting Case II, which was hopeless before the serum was administered, there is a mortality of 22.2 per cent. The epidemic in the District of Columbia 1898–9, 110 cases, gave a mortality of 81.98 per cent. The reports of numerous observers in the past place the mortality of this disease from 66 per cent. to 85 per cent. before the use of the serum. Up to February 19, 1908, Flexner* reported 130 cases treated with the serum, of which 95 recovered and 35 died, a mortality of 27 per cent.

The severity of the infection and clinical course of our cases has been quite irregular. On the whole it may be stated that the serum injections have been followed by marked improvement in the meningeal symptoms, fall in temperature and shortening of the course of the disease. The earliest day of the disease on which the serum was injected was the fourth; the latest, the forty ninth. Six cases were between the thirty-fourth and thirty-seventh day, all recovering.

Observations were made, before and after the serum injections, upon the influence of the serum upon the number, appearances and growing properties of the diplococcus; upon the relation of the diplococcus to phagocytosis; upon the appearances of the leucocytes; and the influence of the serum upon the number of

* *Journal A. M. A.*, Feb. 22, 1908.

leucocytes per c.c. in the circulating blood, and also coincidently the number in the spinal fluid.

The largest dose administered at any one time was 30 c.c.; the smallest, 5 c.c. All injections were made into the spinal canal.

### Summary.

1. In ten cases of epidemic cerebro-spinal meningitis treated with the antimeningitis serum, seven recovered and three died, giving a mortality of 30 per cent. Omitting one of the cases, which was one of chronic hydrocephalus, we have a mortality of 22.2 per cent.

2. Following the serum injections there was usually considerable improvement in the clinical symptoms.

3. The course of the disease was considerably modified: an average of twenty-three days for all seven, and in five of the cases, fifteen days.

4. Only two cases recovered with sequelae.

5. The serum caused a marked diminution in the number of diplococci in the spinal fluid; a disappearance or degeneration of the organism in coverslips; and, in the majority of cases, its growth was promptly inhibited.

6. Phagocytosis was either unchanged or increased.

7. In five out of eight cases the leucocytes showed degenerative changes following the serum injections. This explains the rapid clearing of the fluid observed following the injections.

8. The leucocyte count rose in three cases, all of which recovered. It fell in five cases, two of which died.

9. The disappearance of the bacillus in Case II, and probable disappearance of the one in Case VI, suggests the use of an indifferent serum in influenza meningitis.

**Dr. S. S. Adams** said that the papers had presented a collection of facts of great interest to the clinician and bacteriologist. Most of his own cases of cerebro-spinal meningitis had corresponded closely with the composite description given by Dr. Morgan's chart. He had had a series of four cases; only three were both clinically and bacteriologically verified—the fourth did not furnish the diplococcus in the spinal fluid; it was accordingly thrown out of the series, though all received the antiserum.

The first case was a boy, the patient of Dr. Roy, who had been playing in the snow when he became suddenly ill, with con-

vulsions and marked opisthotonos. The clinical signs in this case were: petechiae, Kernig's, Babinski's, opisthotonos; whether there was hyperesthesia could not be demonstrated on account of coma. Thirty c.c. of spinal fluid were withdrawn and 15 c.c. of the serum injected; there was marked improvement but consciousness did not return. Two days later 15 c.c. of serum were injected. After the administration of 60 c.c. consciousness returned. At this time there was increase in the leucocyte count from 14,000 to 59,000; Flexner had no explanation to offer for this phenomenon. Had there been an additional infection introduced by lumbar puncture? After temporary improvement, the meningitis increased and the boy died in spite of the administration of 150 c.c. of the antiserum.

Second case: Colored child, four years old; brought to the hospital in police ambulance. The clinical signs were those of epidemic cerebro-spinal meningitis; fluid was withdrawn and serum given, but no culture could be obtained from the fluid. The child recovered in a few days and no more fluid could be had to verify the diagnosis.

Third case: Mulatto boy of 14; while working or playing in the open fields he had a chill with convulsions. He was brought to the Georgetown University Hospital and was seen at once by Drs. Vaughan and Behrend; they withdrew about four ounces of fluid by lumbar puncture—the fluid was so turbid with pus and other débris that there was a deposit 60 per cent. by volume. Dr. Adams was called to inject serum, but was handicapped by a defective syringe, and in default of anything better he injected 30 c.c. under the skin. At this time there was marked opisthotonos, eyes congested and protuberant, convulsive twitchings and muttering delirium; the picture was typical. On the following day he withdrew by puncture about 60 c.c. of fluid, which was under considerable pressure; 30 c.c. of serum were injected and marked improvement followed. The diplococcus was found in this case, but quickly disappeared after the administration of the antiserum. No further serum was needed after the last-mentioned dose had been given, and the boy went on to rapid recovery.

Fourth case: A child five months old presented symptoms of meningitis, the type of which at first was in doubt. After four days Dr. Kaveney had the baby taken to Children's Hospital. The anterior fontanelle was very protuberant and the right eye was closed on account of great swelling of the lids; this was accounted for by presuming that the cerebro-spinal fluid had found its way through the tissues by way of the fontanelle. He hesitated at first to do lumbar puncture on account of the tender age of the child, but concluded to do so, and upon introducing the needle, the fluid spurted 2½ or 3 feet, such was the pressure. 30 or 40 c.c. were withdrawn and 15 c.c. of serum injected; at

the same time 7½ c.c. were injected under the skin. The child immediately began to improve; in forty-eight hours the edema of the right eyelids had disappeared, and convalescence proceeded without mishap.

As to the curative value of Flexner's serum, if we go by the mortality returns, even the most skeptical must admit that the serum is productive of some good. Before the antiserum was used the mortality rate was 70 per cent.; and the 30 per cent. that escaped death were left idiotic or paralytic or too often in some equally pitiable state. Dr. Adams thoroughly believes in the serum therapy for this disease, and strongly advocates lumbar puncture as a diagnostic procedure, as its harmlessness has been proven.

**Dr. Claytor** referred to the usual history of sudden onset and said that there could be no doubt that nearly all cases come on suddenly. The most fulminating case he had ever seen was that of a child who went to bed apparently in perfect health; she awakened in the morning in good spirits, played all the forenoon, took a nap at 3 o'clock, woke up with a convulsion and was dead at 8 o'clock in the evening. This case was too overwhelming to expect anything from the use of the serum, but in any case it is essential that the diagnosis be made early. He believed that after the cases reported to the Society no member would hesitate to make a spinal puncture and thus prove or disprove the diagnosis. The tenth case reported by Dr. Morgan Dr. Claytor had seen late at night; to his regret he had waited until morning to make the spinal puncture. After the administration of serum there was some improvement; but he had seen cases in which no serum was used markedly improve, only to lapse later.

As to injecting an equal amount of serum to the fluid withdrawn at puncture, he doubted the wisdom of that procedure.

**Dr. Wm. A. White** said that they do not see acute cases of meningitis at the Government Hospital for the Insane, but that they have the opportunity to study the terminal effects, such as childishness, idiocy, etc. It is the practice at the hospital to perform lumbar puncture in the study of paretics and syphilitics; there never seems to result any harm from the measure, except that sometimes when too much fluid is withdrawn there may be a transient faintness.

**Dr. Nichols** said that in view of the brilliant results achieved by the authors of the paper he regretted that he had three fatal cases to report.

First case: A colored laborer who was given three injections of serum on the fourteenth, sixteenth and eighteenth days. The fluid cleared up, but otherwise the serum did not seem to do any good.

Second case: A colored boy was injected with serum on the sixth and eighth days. This boy did not seem very ill until the

last day; intense retraction of the head and Kernig's sign were present. On account of the pain and intense spasm he had injected also magnesium sulphate solution, after the manner of Melzer; the patient did not complain of pain for thirty-six hours after the use of the magnesium sulphate, although the motor symptoms continued. He recognized that the magnesium sulphate may have interfered with the efficacy of the serum.

Third case: A barber, 53 years of age. Twenty-five c.c. of serum were injected on the fourth day; the man was quite unconscious at this time and died with no apparent result from the serum. There was probably a complicating pneumonia in this case, although the temperature was subnormal, the pulse slow and the respirations 40.

In spite of his ill luck in his cases, he felt that the antiserum occupies an important and successful place in the therapy of this disease, and that it is quite comparable to the antidiphtheritic serum.

With reference to the after history of meningitis victims, he had in the past year seen two recovered cases without any sequelae whatever.

Dr. Morgan had spoken of the slight contagiousness of this disease; Dr. Nichols' idea is that the primary infection is in the nasal chambers and manifested by a coryza or rhinitis; thence the infection at times makes its way to the meninges. For every case of epidemic meningitis there may be many cases of diplococcus intracellularis coryzae which are not recognized and in which the infection does not extend beyond the nose. Such cases are, however, infection carriers.

**Dr. Jas. Stuart** had been much gratified to learn of the excellent results obtained in the series reported. It seemed to him that sporadic cases are not so apt to be as virulent as epidemic cases. In a recent epidemic he had had ten cases, all verified by autopsy or spinal puncture. Of these, five died on the third day; the others died before the seventh. Many of the injections in the series reported were made very late; what effect would the serum have had if the cases had been virulent? There would seem to be several types of the disease, which might be characterized as ordinary, fulminant and chronic. As to the contagiousness of the disease, two of his cases occurred in the same house. He felt confident that the serum will prove of the utmost value.

**Dr. Hickling** said that it had occurred to him that Dr. Flexner's caution not to use the serum except in proven cases might prove a deterrent to the adoption of its use by the general profession. It is quite natural that he should wish proper precautions to be exercised, but is the serum not harmless in any event? It is imperative that the serum be used early, probably because of the bacteriolytic influence it exerts.

**Dr. J. D. Thomas** said that one feature of the serum therapy of this disease is very impressive: that without animal experimentation its discovery would have been impossible. He suggested that physicians might do good in combating the antivivisection movement by teaching their patients these facts.

**Dr. J. Dudley Morgan** said it was unfortunate that Dr. Adams' second case could not be confirmed bacteriologically. One case had been sent to Garfield Hospital as meningitis of the epidemic type, but the diplococcus could not be demonstrated and it was sent away. There could be no doubt as to the necessity of the early use of the serum. With reference to the quantity of fluid withdrawn at puncture, not much attention had been paid to that feature; 50 or 60 c.c. were ordinarily obtained without much effect on the patient; the injections of serum were usually to the amount of 15 or 30 c.c. at the dose. Dana has suggested the use of dilute solutions of ergot to combat the headache and general uneasiness.

The complications and sequelae of the disease are very distressing, particularly the deafness or blindness that is so apt to follow. Pneumonia is referred to by all writers as a frequently fatal complication. Suddenness of onset is almost pathognomonic. The sudden changes in the mentality of these patients without other change of symptoms is very remarkable.

With regard to the contagiousness of the disease, Koplik has found the diplococcus in the nose in 50 per cent. of his cases; among physicians and nurses attending these patients the organism was found in the nose in 10 per cent.

**Dr. Wilkinson** said that Dr. Hickling had referred to Flexner's injunction not to use the serum in cases in which the organism cannot be found; in the ninth case of the series, after three punctures no diplococci could be found. The clinical signs were in every way typical, and Flexner waived the prohibition to the use of the serum in this case. It is useless to object to Flexner's restrictions, since he makes the serum, and it can be obtained nowhere else. Reference had been made to the hypodermatic use of the serum; it had been used thus in an epidemic in Akron, Ohio; Flexner thinks the serum would not be of much service used in this way, as it is a colloid, and colloids are not diffused into the spinal cord.

In the cases of this series the procedure had been to introduce the needle for spinal puncture, the first c.c. of fluid was taken at once to the laboratory for cover-slip examination, the needle was allowed to remain while collecting fluid for cultures; meanwhile, the diagnosis having been confirmed by the cover-slip examination, the serum was injected without second introduction of the needle.

As to injecting the serum when the pressure has been great, no harm is done, because after the serum injections the quantity of fluid is reduced, apparently from some action of the serum.

## PROCEEDINGS OF THE MEDICAL SOCIETY, DISTRICT OF COLUMBIA.

**Wednesday, May 13, 1908.**—The President, Dr. H. D. Fry, presided; about 50 members present.

Dr. Mackall, Chairman of the Executive Committee, reported that the committee had endorsed the project of the Washington Academy of Sciences to publish a weekly periodical and recommended that the Medical Society participate in the movement as outlined by the Academy. The report was adopted.

Dr. Franzoni moved that the congratulations of the Society be given Dr. Geo. M. Kober upon the distinction of having been invited by the President of the United States to address the Conference of Governors, then in session, upon "Public Sanitation." Dr. Franzoni commented upon the distinguished character of the gathering and said that the selection of a member of the Society to address it was an event that he wished recorded in the minutes of the proceedings. The motion was carried.

Dr. I. S. Stone reported a case of Intestinal Tuberculosis, with specimen; he also presented a specimen of Extrauterine Fetation. Discussed by Drs. Vaughan, Balloch and Taber Johnson. See p. 303.

Dr. Briggs read the paper of the evening. Subject: "Mild and abortive types of Typhoid Fever." Dr. S. S. Adams, in opening the discussion, reported a case of typhoid fever with unusual nervous symptoms. The paper was also discussed by Drs. Wood, I. S. Stone, Randolph and Brecht.

**Wednesday, May 20.**—The President, Dr. Fry, presided; about 65 members present.

Dr. D. S. Lamb presented a specimen from a case of Cerebro-spinal Meningitis.

Drs. J. Dudley Morgan and W. W. Wilkinson read a joint paper upon "Ten cases of Epidemic Cerebro-spinal Meningitis treated with antimeningitis serum." Discussed by Drs. S. S. Adams, Claytor, Wm. A. White, Nichols, Jas. Stuart, Hickling and J. D. Thomas. See p. 308.

**Wednesday, May 27.**—The Vice President, Dr. J. Thomas Kelly, presided; about 50 members present.

Dr. S. S. Adams said that in view of the report and discussion on Epidemic Cerebro-Spinal Meningitis at the last meeting, it seemed appropriate to state to the Society that he had heard a symposium upon this subject during the week in New York. Flexner had reported a new series of cases, the mortality reduced by the use of the serum from 60 per cent. or 70 per cent. to 25 per cent.; that the mortality for the whole United States in cases

treated with the serum was down to 19 per cent.; that in all the cases considered the organism had been demonstrated. The unanimous opinion at the symposium was that the serum had come to stay as a specific cure for the disease.

Dr. Wellington reported a case of Torsion of the Omentum, with specimen. Discussed by Drs. Jack and Snyder.

Dr. Vale read a paper upon "The Effect of Surgical Treatment on the Fatality from Appendicitis." Discussed by Drs. Williams, Jack, Wellington, Wood, Randolph, Hickling, Hagner, Chappell, Barnes, E. L. Morgan, Kober, Prentiss Willson. See p. 304.

Dr. Hickling read a paper upon "The Classification of Insanity." Discussed by Drs. Wm. A. White, Williams, Wilbur. See p. 297.

**Semi-annual Stated Meeting, Monday, July 6.**—The President, Dr. H. D. Fry, presided; twenty-two members present.

The following candidates for membership were proposed and their names referred to the Board of Censors for investigation and report:

Frederick W. Didier, George Washington University, 1904.
Edward H. Egbert, Baltimore Medical College, 1905.
Carl Henning, George Washington University, 1905.
John R. Buck, George Washington University, 1904.
Mary O'Malley, Niagara University, 1897.
Mead Moore, George Washington University, 1906.
Moses Hubbard Darnall, George Washington University, 1907.
Julian M. Cabell, University of Virginia, 1885.
Howard Hume, University of Virginia, 1905.
John Harvie Waring, George Washington University, 1907.
Joseph J. Kinyoun, Bellevue Hospital Medical College, 1882.

Dr. D. S. Lamb reported informally for the Committees on History and Editing the Transactions. The following appropriations were granted: Publication of the ANNALS, $159.52; engravings for the History, $40.00.

The Corresponding Secretary reported the receipt of a letter from Buda Pesth inviting the Society to send delegates to a medical congress to be held in that city. Referred to the Committee on Publication.

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DR. MOTTER HAS RESIGNED FROM THE COMMITTEE OF PUBLICATION of the Transactions of the Society and Dr. Chas. S. White has been appointed to the vacancy. The chairman of the committee desires to express his regret at the resignation and his appreciation of the work of Dr. Motter.

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CHAS. S. WHITE, M. D., . . . . . The Farragut.


## Editorial.

REGISTRATION OF PHYSICIANS IN THE DISTRICT OF COLUMBIA.—The following bill was introduced into the U. S. Senate, May 5, 1908, by Senator Gallinger, and referred to the Committee on the District of Columbia (S. 6,976):

"A BILL to amend sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia.'

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia,' be, and the same are hereby, amended so as to read as follows:

"SEC. 3. That from and after the passage of this Act all persons desiring to practice medicine and surgery in any of their branches, or to treat human ailments in the District of Columbia, shall apply to said board of medical supervisors for a license to do so. Applicants shall submit to examination upon the following-named branches, to wit: Anatomy, physiology, chemistry, pathology, materia medica and therapeutics, hygiene, histology, practice of medicine, surgery, obstetrics and gynecology, diseases of the eye and the ear, medical jurisprudence, and such other branches as said board shall deem advisable. Each applicant shall be certified by said board for examination as speedily as possible to the board of medical examiners whose members are adherents to the system of medicine which said applicant desires to practice; but said board shall not certify for examination any applicant until

satisfactory proof is furnished that he or she is of good moral character and over twenty-one years of age nor until he or she has presented at least a certificate or diploma issued after four years of study either in a normal, manual training or high school of the first grade or in a legally constituted academy, seminary, or institute of equal grade, or a student's certificate of examination for admission to the freshman class of a reputable literary college, or has received an academic education, considered and accepted by the superintendent of public instruction of the District as fully equivalent, and has either received a diploma conferring the degree of doctor of medicine from some legally incorporated medical college (which in the opinion of said board was in good standing at the time of issuing said diploma) in the United States, or a diploma or license conferring the full right to practice all the branches of medicine and surgery in some foreign country, and has also studied medicine not less than four full school years of at least nine months each, including four satisfactory courses of lectures of at least seven months each in four different calendar years in some legally incorporated American or foreign medical college or colleges prior to the granting of said diploma or foreign license: *Provided*, That said diploma, if issued prior to July first, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that said applicant has studied medicine and surgery for not less than three years prior to the issue thereof, and if issued subsequent to June thirtieth, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that the applicant has studied medicine and surgery for not less than four years prior to the issue of said diploma. All examinations shall be both theoretical and practical and of sufficient severity to test a candidate's fitness to practice medicine and surgery.'

" 'SEC. 8. That if in the opinion of a majority of the board of medical supervisors, after a careful examination of the report of the board of medical examiners by which any applicant was examined, said applicant has fairly and successfully passed such examination as hereinbefore provided for, the board of medical supervisors of the District of Columbia shall, as soon thereafter as possible, issue to him a license signed by the president and the secretary of said board and attested by the seal of the District of Columbia, which license shall entitle said applicant, after it is registered as hereinafter provided, to practice medicine and surgery in the District of Columbia: *Provided*, That a license shall be issued upon application, free of cost and without examination, to each physician who is registered at the health office of the District of Columbia at the time of the passage of this Act, and to physicians who may change their residence to the District of Columbia from any State or Territory where medical laws and medical examining boards exist, the presentation of a certificate

or license from a medical examining board, if found upon due inquiry to be true and genuine, being sufficient evidence of right to registration and certification under the provisions of this Act: *Provided*, That the medical laws and examining boards of such States and Territories, whose requirements are equal to those of the District of Columbia, grant equal rights and recognition to the licentiates of the board herein created. All licenses issued by said board shall be numbered consecutively, and a register shall be kept by the secretary showing the number of each license, the date of issue, and to whom issued.'

"'SEC. 13. That from and after the passage of this Act any person practicing medicine and surgery, midwifery, or treating human ailments in the District of Columbia, or who shall publicly profess to do so, without first having obtained from the Board of medical supervisors of the District of Columbia a license and registered the same as herein provided, or in violation of any of the provisions of this Act or any of the rules and regulations made by authority conferred herein, or after his license or registration has been canceled by order of said board of medical supervisors of the District of Columbia, shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished for each offense by a fine of not less than fifty nor more than five hundred dollars, or by imprisonment in the District jail for a period of not less than ten nor more than ninety days, or by both such fine and imprisonment. It shall be the duty of the United States district attorney for the District of Columbia to prosecute all violations of the provisions of this Act.'"

It would seem that a law such as that of New York or Texas, which provides for a *single* examining board and omits from the examination the subjects of materia medica, therapeutics and practice of medicine, and requires only that the candidate shall have a sufficient knowledge of anatomy, physiology, chemistry, bacteriology, pathology, surgery, gynecology, &c., would be better, permitting the physician to practice on any theory he chooses, which, indeed, he will do anyhow.

We think that this bill needs careful consideration. A number of questions arise; for instance, in section 3 is a requirement that the medical school from which the candidate has graduated must have a course of "four full school years of at least *nine* months each." The italics are ours. How many, or rather, how few medical schools in the United States have a "full school year of nine months?"

The provision in Section 3, that diplomas issued prior to July 1, 1898, shall be accompanied by satisfactory evidence that the ap-

plicant has studied medicine and surgery for not less than three years prior to the issue thereof, probably means that he shall have attended three years at a medical college. Now it should be remembered that the three years requirement in most schools in the United States did not become obligatory before about 1879; in other words, graduates before that time would most likely be barred from the examination provided for in the bill.

The above are probably the most important considerations; there may be others.

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The Following Letter has been received from the Pasteur Vaccine Company, Ltd:

"New York, *June 6, 1908.*

"Washington Medical Annals, Washington, D. C.

"Gentlemen: In connection with the wide-spread and increasing interest throughout the civilized world in the matter of the prevention and cure of tuberculosis you will be interested to learn that Prof. Marmorek, the discoverer of antistreptococcic serum, at the Institut Pasteur, Paris, has signified his willingness, at the request of our Paris house, to supply physicians who are especially known through their work in connection with tuberculosis with a certain amount of his tuberculosis serum for clinical tests gratis. Such physicians, if they will communicate with us, we will immediately place in touch with Prof. Marmorek through our Paris house.

"We should be pleased to supply, for clinical experiments in your wards for contagious diseases, a sufficient amount of a new scarlet fever serum for internal administration gratis.

"Yours very truly, Pasteur Vaccine Co., Ltd."

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Flies.—The Board of Health of New York City has distributed cards among householders, hotel and restaurant proprietors, with the following rules and comments:

"Keep the flies away from the sick, especially those ill with contagious diseases. Kill every fly that strays into the sick room. His body is covered with disease germs.

"Do not allow decaying material of any sort to accumulate on or near your premises.

"All refuse which tends in any way to fermentation, such as bedding, straw, paper waste and vegetable matter, should be disposed of or covered with lime or kerosene oil.

"Keep all receptacles for garbage carefully covered and the cans cleaned or sprinkled with lime or oil.

"Keep all stable manure in vault or pit screened or sprinkled with lime, kerosene or other cheap preparation.

"See that your sewerage system is in good order; that it does not leak and is up to date and is not exposed to flies.

"Pour kerosene into the drains.

"Cover food after a meal; burn or bury table refuse.

"Screen all food exposed for sale.

"Screen all windows and doors, especially the kitchen and dining room.

"Burn pyrethrum powder in the house to kill the flies.

"Don't forget that if you see flies their breeding place is near-by filth. It may be behind the door, under the table or in the cuspidor. If there is no dirt and filth there will be no flies.

"If there is a nuisance in the neighborhood write at once to the Health Department."

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CORRECTION.—The following corrections should be made in the article by Dr. G. B. Miller, "Review of Gynecology," in in the July number of the ANNALS, page 217 *et seq.* On page 220, third line from the bottom are the words "the condition is not ineffectually remedied;" should be "effectually." On page 221, fourth line from the top, is the statement that "In both cases the patient separated the adhesions;" this should read: "in case of both patients the adhesions were separated."

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NOISES IN CITIES.—In the ANNALS, Vol. VI, July, 1907, page 251, was an editorial on the above subject. The Police Department of New York City has issued a general order, synoptically as follows: Unnecessary noises must be suppressed. The unnecessary use of horns, sirens, whistles or bells on automobiles or motorcycles. Hand organs may play between 9 A. M. and 7 P. M. Loud noises caused by moving through the city rails, pillars and metal columns to be stopped. Animals making unnecessary noises must be got rid of. The following also are to be suppressed: the shouting of street hawkers; all unnecessary shouting and yelling; unnecessary blowing of steamboat or factory whistles; roller skating on sidewalks and in streets when interrupting traffic; whistling peanut roasters; exhausts from mobiles and cycles unless properly muffled; blowing horns or bugles or ringing bells by scissors grinders; yelling "old

clothes" ; yelling "extras" at night ; kicking tin cans on sidewalks ; yelling of carriage barkers at theaters and hotels ; flat wheels on street cars ; barking dogs.

It is gratifying to know that the authorities in this District have also taken up this subject.

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MINUTES OF THE NATIONAL MEDICAL ASSOCIATION OF PHYSICIANS, DENTISTS AND PHARMACISTS, U. S. A.—MEETING AUGUST 27–29, 1907, AT BALTIMORE, MD.—This is a 96-page pamphlet setting forth the work of the Association at the meeting in 1907. The association is one of colored physicians, dentists and pharmacists. It was formed in 1895, at the time of the Exposition at Atlanta, Ga. A second session was held at Nashville at the time of the Tennessee Centennial, 1897. The third was in Louisville in 1900 ; in 1901 at St. Louis ; at Nashville again in 1903 ; in 1904 at Lexington, Ky.; at Richmond, Va., in 1905 ; in 1907 at Baltimore, Md.; and it may be added that the meeting for 1908 will be held in New York City. The Secretary's report for 1907 shows that there were then over 173 members, fifteen States had each a State organization, and six cities a city society. The officers include an Executive Board and a Vice President for each State society. There is a General Secretary and Assistant Secretary, and a Special Secretary each for the Dental and Pharmaceutical Sections. The Dentists and Pharmacists formed separate sections for consideration of dental and pharmaceutic papers. Apparently the interest among the members is steadily increasing. The 1907 session covered three days of work, with the usual entertainments of such assemblies.

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BUREAU OF PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.—A board of commissioned medical officers will be convened to meet at the Bureau of Public Health and Marine-Hospital Service, 3 B Street, S. E., Washington, D. C., Monday, September 14, 1908, at 10 o'clock A. M., for the purpose of examining candidates for admission to the grade of assistant surgeon in the Public Health and Marine-Hospital Service.

For further information, or for invitation to appear before the board of examiners, address "Surgeon-General, Public Health and Marine-Hospital Service, Washington, D. C."

The American Medical Missionary College.—The prospectus of this college for the session 1908–9 is received. The College is situated at Battle Creek, Mich., and Chicago, Ill.; that is to say, part of the work is done in one place and part in the other. The college is intended to combine both the religious and medical training for a well-equipped medical missionary. Dr. Howard A. Kelly, of Johns Hopkins, is one of the Advisory Council. The college appears to have all facilities required for successful teaching. Persons who are sufficiently interested can obtain all needed information from the Registrar, Rowland H. Harris, Battle Creek, Mich.

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The International Tuberculosis Congress.—This Congress will meet in this city September 21 to October 12, 1908. Its organization has been entrusted to the "National Association for the Study and Prevention of Tuberculosis." The Secretary of the Committee on the Congress is Dr. Joseph Walsh, of Philadelphia, and this Committee has appointed as Secretary General of the Congress Dr. John S. Fulton, 714 Colorado Building, Washington, D. C.

The Congress will be divided into seven sections, as follows.

1st. Pathology and bacteriology; the secretaries are Drs. H. C. Ernst, of Boston, and W. R. Stokes, of Baltimore.

2d. Clinical study and therapy of tuberculosis; sanatoria, hospitals and dispensaries; secretaries, Drs. E. A. Locke, Boston, W. J. Barlow, Los Angeles, and G. Bourgeois, Paris, France.

3d. Surgery and orthopedics; Drs. W. D. Haggard, Nashville, Tenn., and J. T. Bottomley, Boston.

4th. Tuberculosis in children; etiology, prevention and treatment; Drs. David Bovaird, Jr., New York City, and F. S. Churchill, Chicago.

5th. Hygiene; social and economic aspects of tuberculosis; Mr. A. M. Wilson, Chicago, and Miss Lillian Brandt, New York City.

6th. State and municipal control of tuberculosis; Dr. J. W. Kerr, Washington, D. C.

7th. Tuberculosis in animals and its relation to man; Dr. J. R. Mohler, Washington, D. C.

The section work will be done in the week September 28 to

October 3, and during this week there will be two general meetings. There will be a tuberculosis exhibition from September 21 to October 12, accompanied by special lectures, clinics and demonstrations. A number of prizes are offered. The proceedings will be published. Active members pay a fee of $5.00, associate members $2.00. A provisional itinerary has been arranged.

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Printing The "History."—From present appearances (August 10) the MSS. of the "History," or, at any rate, the first part of it, will go to press by the first of September. Many members have not taken the trouble to look over the MSS. of their personal sketches. Many members also have failed so far to give or loan their photographs to the committee, for the purpose of having half tones made for the "History." This is especially true of those who have joined the Society since 1904. Attention has been called many times to these matters; the time must come, and that not a long time hence, when it will be too late to attend to them. *Verbum sap.*

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The XVIth International Medical Congress.—Secretary General, Professor Emil Grósz, M. D.—Office, Budapest, VIII, Esterházy-utcza 7.—In accordance with the resolution passed at Lisbon on the 26th April, 1906, the XVIth International Medical Congress will be held at Budapest from the 29th August till the 4th September, 1909, inclusive.

"His Imperial and Apostolic Royal Majesty Francis Joseph I, has deigned to accord his august patronage to this scientific gathering. The Royal Hungarian Government and the Municipality of the Capital and Residence City of Budapest have also promised to afford us their great and benevolent support.

"In the name of the Executive Committee of the Congress, we invite you, Sir and most honored Colleague, to take an active part in the work of this scientific gathering. The rules, which you will find annexed, will give you all the necessary preliminary information, and the programme enclosed will show you that we are in a fair way to be able to bring before the Congress many important questions of Medical Science which form the subject of much discussion at the present day.

"The eminent specialists whose names figure on our pro-

gramme,—besides Hungarian savants—leading lights of the Medical profession in all countries have promised us their valuable coöperation. We hope, Sir and most honored Colleague, that you also will identify yourself with our scientific work, and contribute thereto the results of your own labors and experience.

"As far as we are concerned, with the concurrence of our colleagues in Hungary, we shall spare no effort in order that the XVIth International Medical Congress may in every respect be worthy of its predecessors, and we shall do our best that all our guests may hereafter cherish pleasant memories of their visit to Budapest."

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## Exchanges.

*Annals Gynecology and Pediatrics.*
*Buffalo Medical Journal.*
*Colorado Medicine.*
*Cronica Medica Mexicana.*
*Folia Therapeutica*, London.
*Illinois Medical Bulletin.*
*Journal Kansas Medical Society.*
*Journal Medical Society New Jersey.*
*Journal Michigan Medical Society.*
*Louisville Monthly Journal Medicine and Surgery.*
*Maryland Medical Journal.*
*Modern Medicine.*
*New York State Journal Medicine.*
*Northwest Medicine.*
*Pacific Medical Journal.*
*Proctologist.*
*Providence Medical Journal.*
*Texas State Journal Medicine.*
*West Virginia Medical Journal.*

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## Publications Received.

"Purulent pyelitis treated by lavage of the renal pelves." Report of six cases. Winfield Ayres. Reprint.

"Relation of appendicitis to gynecological pelvic diseases." S. W. Bandler. Reprint.

Minutes National Medical Association of Physicians, Dentists and Pharmaceutists, 1907.

Bulletin Bureau of Labor, No. 15, March, 1908.

"Further studies in treatment of tuberculous sinuses, &c." E. G. Beck. Reprint.

"Report of fatal case of rabies." "Physical examination of volunteers U. S. Army." "Psychotherapy." Dr. P. C. Hunt. Three reprints.

Annual report Insane Department Pennsylvania Hospital.

"Oxygen in medicine and surgery." W. S. Bainbridge. Reprint.

Announcement American Medical College, 1908–9.

"Influence of alcohol on the opsonic power of the blood." C. E. Stewart. Reprint.

"Influence of flesh eating on endurance." Irving Fisher. Reprint.

"Hydriatic method in treatment of cardiac disease." J. H. Kellogg. Reprint.

"Value of an absolutely vegetarian diet in psoriasis." L. D. Bulkley. Reprint.

"Diagnosis of the common diseases of childhood." W. B. Brown. Reprint.

*American Health*, July, 1908.

## Medical Miscellany.

**The Edward N. Gibbs Memorial Prize, $1,000.00.**—Subject: The Etiology, Pathology and Treatment of the Diseases of the Kidney.—The New York Academy of Medicine announces that the sum of $1,000.00 will be awarded to the author of the best essay in competition for the above mentioned prize. Essays must be presented on or before October first, 1909. The three subjects mentioned in the title need not be treated with uniform fulness, but new discovery or fruitful research will be considered the standard of merit. Each essay must be in English, typewritten, designated by a motto or device, and accompanied by a sealed envelope bearing the same motto or device, which shall contain the name and address of the author. No envelope will be opened except that which accompanies the successful essay. The Academy reserves the right, according to the direction of the donors, not to award the prize if no essay shall be deemed worthy of it. The Academy will return the unsuccessful essays,

if claimed by their respective authors, or by authorized agents, within six months. An essay must show originality in order to obtain the prize. The competition is open to members of the regular medical profession of the United States. The successful essay shall be the property of the Academy, and, according to the deed of gift, will be published in its Transactions. Essays should be transmitted to the "Committee of the New York Academy of Medicine on the Edward N. Gibbs Memorial Prize."

**Samuel D. Gross Prize, $1,500.00.**—This prize is awarded every five years for the best original essay not exceeding 150 printed pages octavo, on some subject in surgical pathology or surgical practice, founded on original investigations. Candidates must be American citizens. The successful competitor is required to publish his essay in book form, deposit one copy in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and on the title page shall state that the essay was awarded the Samuel D. Gross prize of the Philadelphia Academy of Surgery. The essays must be in English, and be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of College of Physicians, 219 South Thirteenth Street, Philadelphia," on or before January 1, 1910. Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. Unsuccessful essays will be returned to the writers if requested by them within one year. The committee, which comprises Drs. W. J. Taylor, R. H. Harte and DeForrest Willard, reserves the right not to make an award if in its opinion none of the essays are worthy.

**Smithsonian Institution.**—Hodgkins Fund Prize.—In October, 1891, Thomas George Hodgkins, Esq., of Setauket, N. Y., made a donation to the Smithsonian Institution, the income from a part of which was to be devoted to "the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man." In furtherance of the donor's wishes the Smithsonian Institution has from time to time offered prizes, awarded medals, made grants for investigations, and issued publications.

In connection with the approaching International Congress on Tuberculosis, which will be held in Washington Sept. 21 to Oct. 12, 1908, a prize of $1,500 is offered for the best treatise "On the Relation of Atmospheric Air to Tuberculosis." Memoirs having relation to the cause, spread, prevention or cure of tuberculosis are included within the general terms of the subject.

Any memoir read before the International Congress on Tuberculosis, or sent to the Smithsonian Institution or to the Secretary

General of the Congress before its close, namely, Oct. 12, 1908, will be considered in the competition.

The memoirs may be written in English, French, German, Spanish or Italian. They should be submitted either in manuscript or typewritten copy, or if in type, printed as manuscript. If written in German they should be in Latin script. They will be examined and the prize awarded by a Committee appointed by the Secretary of the Smithsonian Institution in conjunction with the officers of the International Congress on Tuberculosis.

Such memoirs must not have been published prior to the Congress. The Smithsonian Institution reserves the right to publish the treatise to which the prize is awarded.

No condition as to the length of the treatises is established, it being expected that the practical results of important investigations will be set forth as convincingly and tersely as the subject will permit.

The right is reserved to award no prize if in the judgment of the Committee no contribution is offered of sufficient merit to warrant such action.

Memoirs designed for consideration should be addressed to either "The Smithsonian Institution, Washington, District of Columbia, U. S. A.;" or to "Dr. John S. Fulton, Secretary General of the International Congress on Tuberculosis, 714 Colorado Building, Washington, District of Columbia, U. S. A." Further information, if desired by persons intending to become competitors, will be furnished on application.

(Signed) CHARLES D. WALCOTT,
*Secretary of the Smithsonian Institution.*

**The Influence of Alcohol on the Opsonic Power of the Blood.**—Dr. Chas. E. Stewart, Battle Creek, Mich., read a paper on this subject before the American Society of Alcohol and Drug Neuroses, Atlantic City, June 4, 1907. Printed in *Modern Medicine*, November, 1907. As a result of his experiments he found that the use of port wine greatly lowered the opsonic power of the blood to the extent of 37 to 42 per cent. After the use of Peruna the loss was 36 to 88 per cent.

**Tobacco.**—Dr. M. Woods, of Philadelphia, in the *Journal of Inebriety* for June, 1908, has an article on "Certain aspects of the tobacco question," abstracted in *Journal American Medical Association*, as follows: Woods singles out the tobacco question from other habits, inasmuch as this drug he says has no beneficial use in any medical sense making it necessary or proper for us to recommend it. He denies that it aids digestion, that it prevents lean people from getting stout, or vice versa, that it possesses any power to preserve the teeth from decay, or to neutralize the poison of contagion. It is not a disinfectant or a remedy for any

pathologic condition. While the Dispensatory credits it when moderately taken with quieting restlessness, mental and bodily, he holds that to treat such mere symptoms with a narcotic is merely to deaden the result of a disease while leaving the cause untouched. On the other hand he lays stress on its evil influences, and particularly calls attention to the practice among tobacconists of enclosing suggestive and salacious pictures in tobacco packages. He suggests that the soporific calm and the obscene picture are hand and glove in the production of sexual immorality.

**The Raw Diet.** — Dr. Kellogg, of the Battle Creek Sanitarium, has a short paper on this subject in the July number of *Modern Medicine*. He says that "The raw-diet idea which has been given extensive prominence recently by the advertising exploits of various charlatans posing as food experts, teachers of chemistry of foods, etc., has something in it of real value, but not the things claimed for it by its commercial advocates. Unquestionably man, with other members of the animal kingdom, was originally designed to take his food in an uncooked state. The comparative anatomists generally agree that the natural dietary of human beings consists of fruits, nuts and soft grains; that is, grains in the milk state, in which the nutrient portion, which in the ripe, hard grain is found in the form of starch, exists in the easily-assimilable form of starch and dextrin. That human beings can live and work upon a dietary of this sort is abundantly proved by the experience of a considerable number of individuals who have for weeks, months or years confined themselves to a diet of fruits and nuts with imperfectly-ripened grains. Further evidence in support of this fact is afforded by the fact that many species of anthropoid apes subsist well upon this dietary and exhibit strength and endurance far beyond what is commonly seen in men."

Experience has shown that adherence to a diet of cooked food, to the entire exclusion of uncooked foods, for some length of time, invariably results in great impairment of nutrition; symptoms resembling scurvy make their appearance with other indications of decided malnutrition. This has been especially noted in the feeding of infants. When the science of bacteriology disclosed the vast multitude of harmful bacteria which are found in cows' milk the sterilization of milk by boiling was proposed as a remedy for the obvious danger and was very widely adopted, especially in foundling establishments. Evil results were speedily seen. The gastric and intestinal disorders which so frequently result from the use of ordinary cows' milk vanished, but in their stead appeared evidences of nutritive disturbances of a more subtle and slowly-developing character. For a long time the nature of these disorders and their cause was not fully appreciated, but within the last few years it has come to be regarded as

a well-established fact that the feeding of children on a cooked dietary, whether of milk, gruels, dextrinized cereals or other food is certain to be attended sooner or later by disastrous results.

The belief that many persons suffer from the exclusion of raw food is spreading. Patients with typhoid fever or other acute disorder, or those whose digestive organs are irritable, may be kept on a diet of gruels, broths or other cooked foods to the exclusion of other foodstuffs for weeks and even months. In some of these cases the impairment of nutrition which occurs may be largely due to the exclusive dietary. Certainly in many cases a wonderful change for the better follows the use of raw foods such as fresh fruit juices, whey, buttermilk and even fruit pulp.

Another class of persons who often show benefit from a raw dietary is the class of sedentary men and women who have intestinal intoxication. They are benefitted by the raw dietary because it excludes flesh foods, since in a raw state flesh foods are repulsive. This exclusion removes the chief cause of intestinal intoxication. The undigested remnants of flesh foods putrefying in the colon are the main source of the toxins of this form of autointoxication. The vegetable substances that are substituted are nearly all rich in carbohydrates, a food element that encourages friendly germs to grow, the socalled aerobes. These, by the production of acids in the intestines, prevent the growth of parasitic organisms that give rise to putrefaction, and they are therefore anti-putrid and antitoxic.

Another advantage of the raw-food diet is that vegetable proteids are not readily attacked by putrefactive or poison-forming organisms. It is also probably true that uncooked or living vegetable tissue is much more resistant to bacteria that abound in the intestine. The living cells of plants resist the attacks of invading organisms. A portion of raw cabbage and an equal portion of cooked cabbage were both inoculated with putrefactive organisms obtained from human fecal matter. Both specimens were placed in an incubator at temperature of human body. At the end of twenty-four hours it was found that the number of living germs had diminished in the raw cabbage, but in the cooked had enormously increased. Raw food may therefore exercise a wholesome influence in the alimentary canal by suppressing the development of poisons that are readily generated by the action of germs of cooked food.

It is also quite possible that the body may derive benefit from some substances as enzymes, &c., contained in the raw juices of fruits and vegetables, which are destroyed by the heat of cooking. The form in which the raw food is taken is of importance. Fresh fruits are the most natural and acceptable form. Fruits and nuts are readily digestible in the raw state if properly masticated, and it is a question if the nutritive properties are improved by cooking; perhaps, indeed, impaired. It was formerly supposed that cellulose was entirely indigestible, but this is not altogether

true. It has been shown that the freshly-formed green parts of plants, such as lettuce leaves, the heart of cabbage, and tender parts of asparagus are readily and completely digestible. This is not true of the coarse, woody fiber in the envelope of wheat, oats and other grains. Experiments have shown that the raw starch of potato and cereals is not easily digestible. The use, however, to the system of the indigestible parts of grains, &c., is that the movement of the intestinal contents is hastened and putrefactive processes are thereby lessened.

It may be said, therefore, that for a short time a diet of uncooked food may be used to advantage: the grape cure, the apple cure, the sour-milk cure, the whey cure, etc. For the average person it is only necessary to exclude flesh foods and increase the proportion of raw foods in each meal. Special care should be given to mastication. Portions that cannot be reduced to a liquid or pasty condition in the mouth should be excluded by persons with dilated stomachs or lessened motility of stomach. Again, it may be remembered that where raw food cannot be obtained fresh, dried fruits of many kinds may be brought to a state resembling the fresh by soaking twelve to twenty-four hours in water.

**The Influence of Flesh Eating on Endurance.**—Dr. Irving Fisher, New Haven, Conn., published in *Yale Medical Journal*, March, 1907, the results of his experiments, which led him to the conclusion that large flesh eaters show far less endurance than abstainers, even when the latter lead a sedentary life.

**The Value of an Absolutely Vegetarian Diet in Psoriasis.**—Dr. L. Duncan Bulkley, of New York City, well known for many years as a dermatologist, has an article with the above heading in the *Journal American Medical Association* for Feb. 22, 1908. He says that during the earlier years his restriction in regard to flesh food in this disase related mainly to abstinence from beef and mutton; but in later years his restriction has been greater, excluding all animal food, soups, poultry, fish and eggs; and some patients are placed on an absolutely vegetarian diet, allowing butter but not milk, and excluding in some cases tea and coffee. The treatment was used with persons at all times of life from 9 to 78 years. Improvement has almost invariably followed, and often the entire disappearance of the disease. In some cases the disease has never recurred and the patients have lost all desire for animal food. The oldest person, a man 78 years old, who had had severe psoriasis all his life and had been under observation for years, was at the time of publication almost cured.

Dr. Bulkley then speaks of the general beneficial effect of abstinence from flesh food, stating that in his experience patients felt remarkably well under the diet, and many times when spare gained in weight, and the obese lost weight.

**Interstitial Gingivitis, Pyorrhea Alveolaris, Riggs' Disease.** —Dr. E. C. Briggs, of Harvard University Dental School, has an article on this subject in the *Journal American Medical Association*, August 1, 1908, read at the June meeting of the Association. He says that there are many causes of this disease, or, rather, many conditions that cause disturbances in the nervous and circulatory systems which break down the tissues about the roots of the teeth. The disease is a local expression of a systemic disorder. The ultimate cause is probably the toxins in the intestinal canal. Intestinal putrefaction produces indican in the urine; indican is always found in excess in cases of pus formation.

Among the causes of intestinal putrefaction are improper mastication, which causes gastritis and lessens the production of chlorhydric acid; the pancreatic secretions are stimulated; because of delayed digestion the peptones are carried too far down the tract to be absorbed and are transformed into indol, skatol, etc., by the colon bacillus. Excess of sugar in the intestine, excess of proteids, excess of fat, cause putrefaction; so, also, slow digestion, lack of bile and weak muscular action of the bowel. Talbot has shown that the uric-acid habit is not a cause of interstitial gingivitis.

The treatment is local and systemic. The local treatment consists in massage and mildly-stimulating mouth washes, but especially the hand-polishing system of which Smith is the sponsor, and the proper use of the toothbrush. Other diseases of the mouth must be attended to, especially regulation of the teeth and proper mastication of the food. The teeth are no exception to the rule that organs tend to deteriorate if not used.

*Systemic treatment.*—There may be overeating or overdrinking. Two meals a day are amply sufficient for an active life. As drugs, Briggs recommends podophylin to clear out the bowel, given at night; a saline in the morning. An antiseptic tablet of sulphocarbolates of zinc, lime and soda twice daily. If a gouty tendency, give aspirin or salicylic acid; in obstinate cases, potassium iodide. Calcium sulphid checks the formation of pus. The opsonic index has been taken and the corresponding treatment has been used with success. Most patients with the disease drink little water, not enough. Six to eight glasses of water daily are little enough. Use the lactic-acid ferment and buttermilk, as suggested by Metchnikoff.

Briggs lays much stress on "scaling," that is, cleaning the teeth of the various deposits that accumulate on them. The teeth should be clean and polished. It is often necessary to use a local anesthetic—eucain, cocain or chloretone. Teeth may be removed, cleaned and replanted; Briggs states that he has known such teeth to remain in place as long as twelve years. When the disease has involved the root of the tooth for some distance it is

necessary to remove the toothpulp. Other details of local treatment are given. The entire article is well worth reading.

In the discussion on the paper Dr. Rhein, of New York, while agreeing in the main with Dr. Briggs' statements, believed that many cases of the disease, especially in children, are due to renal trouble rather than intestinal putrefaction. Dr. Talbot, of Chicago, supported the putrefactive cause. Dr. Hoff, of Ann Arbor, agreed with Dr. Briggs. So did Dr. Peck, of Chicago.

**Psychotherapy.**—Dr. L. F. Barker, of Johns Hopkins, has an article on this subject in the same journal; read at the meeting of Association American Physicians, May, 1908. "Ever since the primitive mother began to kiss the sore finger of her crying child to make it well, the human race has, partly instinctively, partly consciously, resorted to mind cure in one or another of its diverse forms to assuage its sorrows, to relieve its anxiety or to mitigate its pain. For these alleviations sometimes priests, sometimes physicians, sometimes laymen, have been agential."

We know of no way of affecting a human being psychically except through stimuli which excite his afferent nerves or through stimuli applied directly to the brain. Pure sensations and pure ideas independent of physical conditions do not exist. Every form of psychotherapy is also a form of physical therapy; probably the better terms would be *psychophysical* influences and therapy. Much of the treatment of disease by drugs has in reality consisted of psychotherapy. Dr. Barker recalls many instances in literature. The physician believed in the drug and the patient believed in the physician. Paracelsus said "No matter whether the object of your faith is real or false, the result you get will be equally good." The suggestive measures used in the temples of Egypt and Greece rival the best equipped modern sanatoriums. Here also the history of magnetism and hypnotism.

Barker says that psychotherapy by persuasion rather than suggestion is the better. The cure is largely procured by the reëducation of the patient by rational therapeutic conversations instead of the exercise of authority or through mere suggestion. Isolation is the great merit of Weir Mitchell's method, the rest cure. To many persons there come times when separation from the world seems necessary; they feel that they must get away from people; the summer vacation in the wilderness; the "retreat" of the Catholic church.

While the main field of application of psychotherapy is in the treatment of the psychoneuroses, it has also functions in combating the psychoses on the one hand and the whole group of somatic diseases on the other. All symptoms that can be influenced by the nervous system are more or less influenced by

psychotherapy. Patients must always be persuaded of the efficacy of treatment and coöperate therewith.

We try to get rid of painful sensations and ideas in the patient by substituting pleasurable ones: amusement, diversion, exercises, a trip somewhere. We help those who are handicapped to to find suitable remunerative occupation; to transplant the misunderstood into a more sympathetic environment. Rewards and penalties have their part.

In suggestion we make no effort to use ideas which will explain to the patient why his interpretations of his symptoms are wrong; we tell him they are wrong; we rely on the authority we have over him to make the suggestive idea effective. When using persuasion we lead the patient by means of his reason to accept an idea and so to arrive at a new opinion. Physicians awaken confidence and inspire the idea of authority by their scientific training and by their mode of inquiry and of examining the patient. The young man without reputation can arouse faith if he have a suitable personality and is well trained in the methods of taking the anamnesis and making the physical examination. Blood counts, bacteriologic cultures, determination of opsonic indices, tuberculin tests, sphygmographic tracings, x-ray photographs and the whole paraphernalia of clinical diagnosis not only give information to the physician, but they also excite belief on the part of the patient.

Suggestion in the waking state may be larvate or direct. Many physicians resort to the larvate method. They recommend forms of treatment and tell the patient that he will get well, see him from time to time and finally tell him he *is* well. The advantage of hypnotic suggestion lies in the greater susceptibility of the patient to heterosuggestion while in the sleeping state. There are dangers in hypnosis; we know what they are, and no one but a physician or trained psychologist should use hypnosis. And always a third person should be present.

In psychotherapy by persuasion the physician has the opportunity to exercise the highest powers of his own mind and makes his appeal to the best qualities of his patient. The principles are those of education in general; it is medical pedagogy. It involves training of the voluntary attention, schooling the emotions and rational education of the will. It is the most rewarding psychotherapeutic method and seems destined to occupy a large part of the energy of medical practitioners. By its aid the physician may rid a patient's mind of harmful ideas and associations, refuting them, or by ignoring them lead the patient to forget them. New ideas and associations are created, supplementing perhaps a limited or faulty education and environment. By occupation therapy he may teach the patient to find health and satisfaction in work. Here the medical psychotherapeutist joins hands with

the great army of educators, the teachers, clergymen and social-science workers.

Psychotherapy has had "a yellow streak" in it so that many physicians have refrained from using it. This is one reason why it is desirable that conservative, scientifically trained men should work with it and let us know their experience of its advantages, limitations and dangers. Its use should always be preceded by an accurate diagnosis.

**Industrial Hygiene.**—In the *Bulletin of the Bureau of Labor* for March, 1908, is a lengthy paper on this subject by Dr. G. M. Kober. It is a study of the relation of occupations to health and longevity, the dangers of the same and their prevention and treatment. It is known, for instance, that bronchitis, pneumonia and tuberculosis are very frequent in dusty occupations; that the sharp, angular particles of iron and stone dust are more liable to cause injury of the air passages than coal, flour, grain and some other kinds of dust; it is also known that workers in lead, mercury, arsenic, phosphorus, poisonous dyes, etc., suffer from their injurious effects, and mining, railroading and those occupations that necessitate working with or around moving machinery involve special danger to life and limb. Dr. Kober gives some history of the action of governments in regard to these matters. He also gives statistics of morbidity and mortality of occupations.

Among the occupations usually classed as inimical to health are bleachers, bookbinders, brass founders, compositors, coppersmiths, electrotypers, stone cutters, gas-works employees, white-lead workers, match workers, those employed in making explosives, firemen, potters, filemakers, operatives in rubber factories. In some trades that are classed as dangerous experience has shown that no harm results when proper safeguards are taken. In the consideration of the question we must also consider the personal element of the workman, his habits, modes of life, food, home environment, etc. There are some occupations in which the alcohol habit prevails unusually, perhaps because of the character of the work, perhaps the result of association; here it would not be fair to attribute the ill health of operatives altogether to the kind of work. Many persons also are in occupations for which they are not physically fitted. There are also factors, such as soil pollution, for which neither the occupation nor the operatives are primarily to blame.

Indoor occupations, broadly speaking, are inimical to health, while outdoor work in the open air favors health and long life. One of the chief dangers of indoor work is the vitiated air. The same fact is true of live stock kept within doors as against the open-air life of the western range.

The census reports of 1900 state that the death rate from con-

sumption in marble and other stone cutters in the United States is nearly six times as much as in bankers, brokers and officials of companies which are indoor occupations. The use of respirators and forced ventilation has much reduced the morbidity and mortality in those occupations in which metallic and mineral dust play a part. In glass cutting and polishing there is also danger of lead poisoning from the lead oxid used. Gem finishers have a high sick rate from consumption. Workers in mica and bronzing powders used in making wall papers, fancy souvenir cards, moldings, frames, are predisposed to respiratory disease.

Coal miners, charcoal men, firemen, chimney sweeps, etc., are exposed to constant inhalation of coal dust and soot, and though subject to chronic bronchial catarrh, consumption is not especially common among them.

Millers and bakers inhale flour dust. Carpenters and cabinet makers are exposed to wood dust—that from hard wood is probably more injurious than from soft wood. In making weavers' shuttles from African boxwood it has been found that there is an alkaloid in the wood the inhalation of which causes depression of the heart, etc. Workers in tobacco have more or less nasal, conjunctival and bronchial catarrh and digestive and nervous derangements ; their consumption rate in the United States ranks next to that of stonecutters. Opinions differ as to women tobacco workers being particularly subject to miscarriage. The practice of cigar makers moistening the cigar with their saliva is likely to disseminate disease.

Operatives in cotton and flax textiles are subject to dust inhalation and consequent diseases of the air passages and digestive organs.

Of animal dusts, that from wool is considered to be less irritating than dust from flax or cotton ; that from horn is believed to be more so than that from bone. In making hats the use of cyanide of mercury and wood alcohol adds to the dangers. One-half the deaths among brushmakers are due to consumption ; due probably to inhaling the sharp fragments of the bristles.

Infective matter in dust : The rag and paper, wool and hair industries. It has long been held, though the danger is probably overrated, that the germs of some diseases, as smallpox, anthrax, scarlet fever, tuberculosis, typhus fever, typhoid fever, diphtheria, measles and cholera, may cling to clothing and be a source of danger in the rag and paper industry. This means that all rags used for paper should be subjected to steam disinfection. The "rag sorters" and "wool sorters" disease is an anthrax infection, acquired by handling infected wool, hides and hair.

Poisonous dust : All occupations in which lead is used are dangerous to health ; in the roasting of lead ores, the making of white and red lead, china and pottery, artificial flowers ; painters, plumbers, varnishers, type founders, type setters, file cutters, glass

and gem cutters, electricians, especially those employed in charging storage batteries, persons engaged in enameling, dyeing, printing, workers in rubber goods, weighted silk, glazing paper, &c. The danger is much reduced when proper measures of prevention are taken. In the Government Printing Office, Washington, the conditions are hygienic. The air of the rooms is frequently changed. It seems that women, for some unknown reason, are less susceptible to lead poisoning. The means taken in the office named are elaborate and the results satisfactory.

Arsenical dust: Arsenic is used in making green pigments used for wallpapers, in box and card factories, the cretonne industry, making artificial flowers, &c. White arsenic is used in making shot, preserving furs, in taxidermy, &c. Absorption usually takes place through the skin.

Irritating or poisonous gases and vapors: The dangers may be much reduced by proper precautions. Sulphur dioxid is believed to be a blood poison because of its affinity for oxygen. It is evolved in smelting works, match factories, and in making sulphuric acid. The gas is used also for bleaching cotton goods and straw hats, &c. Operatives suffer from respiratory and digestive disorders.

Hydrochloric acid vapors are evolved from alkali works and in galvanizing works; vegetation in the immediate vicinity is destroyed. The gas is irritating to the mucous membranes. The fumes of sulphuric and nitric acid probably cause similar effects to those of hydrochloric acid. Ammonia vapor rarely causes more than a temporary disturbance. Chlorin gas is usually present in making chlorinated lime, glazed bricks and in bleaching; may cause bronchitis, dental caries and skin eruptions. Iodin and bromin vapors may cause toxic symptoms, catarrh of the mucous membranes, wasting of sexual organs. Bromin preparations are much used in photography. Turpentine vapors may cause gastric and pulmonary catarrh, painful and bloody urination, &c. Turpentine is used in calico printing. Concentrated petroleum vapor causes various symptoms, and there is also the danger of its explosion. Benzin vapors also cause similar toxic symptoms. Carbon monoxid or coal gas deprives the red cells of the blood of their oxygen, and death may promptly follow. The gas is often present in gas and smelting works, around coke and charcoal furnaces. More than one per cent. is fatal to life. Carbonic dioxid is also toxic; well sinkers and miners are sometimes suffocated. It is one of the constituents of choke damp of the mines; also a product of fermentation, and so becomes dangerous to miners, vintners, distillers, brewers and yeast makers.

Carbon disulfid is used in making vulcanized rubber, extraction of fats, &c.; is toxic. Naphtha is used in the same industries. Nitrobenzol is used in making anilin and in making some explosives. In dyeing and cleaning, naphtha, gasoline, wood alcohol,

ammonia, bleaching agents, iron, copper and other salts are used; besides anilin and other dyestuffs. In the rubber industry naphtha has largely replaced carbon disulfid. Naphtha, amyl acetate and wood alcohol are used in making patent leather. Anilin vapor is dangerous to health when present in the air in one-tenth of one per cent. Vapor of wood alcohol has caused blindness; used in making varnishes, &c. In various leather industries the chrome pigments are poisonous. In the manufacture of quinine an eczema is sometimes produced. Brass founders inhale a dust or vapor, perhaps both, from the zinc or copper, causing the "brass founders' ague;" about 75 per cent. of the operatives are affected. Arsenical fumes are often emitted by smelting works. The most important poisonous vapors are those of mercury and phosphorus. Mercurial poisoning occurs in makers of felt, and of barometers and other such instruments. Phosphorus is used in making matches; the danger is from the vapor of the white phosphorus, not the red. In recent years the precautions taken have much reduced the morbidity; as low now as 2 per cent. In the beet sugar industry one form of danger has been the formation of an explosive mixture containing probably carburetted hydrogen.

Occupations involving exposure to extremes of heat, sudden changes and abnormal atmospheric pressure: Stokers, cooks, bakers, blacksmiths, firemen, etc., are apt to suffer from heat exhaustion and thermic fever. Sailors, farmers, motormen, conductors, teamsters, coachmen and others are often exposed to sudden changes in the weather. The effects of heat and cold are intensified by humidity. A cold, damp air abstracts an undue quantity of animal heat, lowers the power of resistance and predisposes to catarrhal and rheumatic diseases. Damp houses favor the development of consumption. Caisson disease, the effect of compressed air in tunnels, caissons, deep mines and diving bells, or, rather, the effect of sudden changes in the pressure.

Occupations involving constrained attitudes: Constrained positions, combined with sedentary life, are very injurious. Weavers, shoemakers, engravers, watchmakers, tailors, lithographers, etc., are all obliged to work in more or less constrained positions that interfere with proper circulation of blood and with respiration and digestion. Consumption, constipation, dyspepsia and hemorrhoids are common, and the duration of life is short. Among bakers we find flatfoot, knockknee and varicose veins, from long standing; also among motormen and conductors. Abnormal curvatures of the spine are found in bakers, cabinet makers and others.

Occupations involving overexercise of parts of the body. Writer's cramp and local paralyses and twitchings are seen in copyists, typewriters, telegraph operators, pianists, violinists, engravers, seamstresses, cigar makers, etc. Pulmonary emphysema is common in performers on wind instruments. Deafness

in boiler makers and mill operators; the former due to the violent vibration of the air, the latter to an inability to hear distinctly except during a noise. Public speakers and singers are liable to have chronic affections of the throat and paralysis of the vocal cords. Watchmakers, seamstresses, engravers and others who use the eyes on minute objects may become nearsighted and have other optical defects. Tobacco testers often have nervous symptoms and visual defects, and tea tasters have muscular twitchings and other nervous symptoms.

Occupations involving exposure to machinery, &c.: These include boiler explosions, accidents from circular saws, being caught in belting, &c.; in coal mines, from falling rock, falls, explosions, machinery in motion, molten metal, hot and corrosive fluids, poisonous gases, &c. While tuberculosis is comparatively rare among coal miners, anthracosis caused by the coal dust is, of course, common, along with chronic bronchitis and emphysema. The air of mines contains much dust and putrefactive gases and choke damp; the high heat, hard work and constrained attitudes add to the morbidity.

In the railway service, besides the hardships and exposure and irregular habits, affecting the respiratory and digestive and nervous systems, there are the accidents, collisions, falling from trains and being struck by cars.

Occupations involving the inhalation of organic gases and vapors: Just how dangerous to health are the vapors and gases from sewers, stables, stockyards, slaughtering and packing houses, glue, soap and candle factories, hide depots, tanneries, fertilizer works, &c., is difficult to state. The average age of workers in these places is high. The workmen become gradually accustomed to the vapors.

There is objection to the employment of children in many of the occupations, because the children are immature, and their development is interfered with; and the employment of women, especially during pregnancy, is in many cases objectionable because the occupation interferes with the growth of the child *in utero*. There is besides the moral effect to be considered. Especially during the last weeks of pregnancy it has been found that want of rest, &c., interferes not only with the proper development of the child but also with the birth.

Dr. Kober considers the special measures for the prevention of tuberculosis among wage earners (page 535); measures for the protection of wage earners (536); sanitation of workshops and quarters for employees (536); cubic air space and quantity of fresh air per hour (538); ventilation (538); temperature (541; humidity of the air (542); lighting (543); prevention of accidents (545); miscellaneous sanitary provisions (546); lodging houses and sleeping quarters (547); permanent expositions devoted to industrial and social betterment of wage earners (548), effects of insanitary houses and overcrowding (549); house dis-

eases (550); what the employee may do to contribute to his own welfare (551). Then follow the appendices.

**Tenth Annual Meeting of the American Proctologic Society.**—This meeting was held at Chicago, June 1 and 2, 1908. Dr. Wm. A. Beach, of Pittsburg, read a paper on "The Treatment of Choice of Stricture of the Rectum.". He emphasized the importance of the syphilitic history, location of the stricture and condition of the colon above the stricture. He concludes that surgical attack of the rectal syphiloma does not insure permanent relief; constitutional treatment should be instituted and colostomy is the choice of operation.

Amebiasis? Its Symptomatology? Diagnosis Sequelae and Use of Formalin and Copper Phenol Sulphonate in the Treatment.—Under the above title, Dr. John L. Jelks, of Memphis, Tenn., called attention to rectal ulceration and detailed twenty-five cases confirmed by microscopal examination, an important and imperative adjunct in the diagnosis. The selection of the proper diet is of great moment. The high irrigation with formalin and copper phenol sulphonate through a recurrent tube washes away the debris and infecting agents, stimulating vasomotor supply, relieving congestion and perhaps aiding in the development of antibodies.

Some Recent Contributions to the Physiology of the Rectum, by Dr. Sam'l T. Earle, Baltimore.—The anus closes by permanent tonus of the two sphincters independent of the will, but dependent upon the expenditure of a constant nervous energy, and not upon the elasticity of the muscle fibers. There are dilator and constrictor fibers to the internal sphincter which may be stimulated through the cord, and the internal sphincter can be dilated or constricted, and the external can be inhibited. Dr. Earle reported a case of Plate with False Teeth in the Sigmoid, giving rise to chills and fevers at irregular intervals. The x-ray located the plate in the sigmoid flexure, on a level with the sacral promontory. Under morphin, hyoscin and cactina anesthesia the body was viewed through the sigmoidoscope and removed.

Galvanic Electricity in the Treatment of Hemorrhoids, Fissure, Prolapse, Ulceration and Non-Malignant Strictures of the Rectum.—Dr. Wm. L. Dickinson, Saginaw, Mich., stated that this was not the method of choice in the majority of cases. It is necessary to bear in mind the opposite effects of the two poles in galvanism. Local cocainization is the preliminary step, after which hemorrhoids and fissures may be treated successfully. The method has yielded good results in his hands in cases of prolapse, ulceration and stricture.

Dysentery, by Dr. J. M. Mathews, Louisville, Ky.—He reported three cases treated by concentrated foods, rest, bowel irrigation and topical applications to the rectal ulcers. He de-

scribed a position in which the proctoscope is best used. The patient rests the anterior surface of the thighs on the table, head directed toward the floor, with the shoulders resting on stools, in other words, completely inverted.

Choice of Anesthesia in Rectal Surgery, by Dr. Jerome M. Lynch, New York.—He reviewed the various methods and recommended the drop method of ethyl chloride for short operations. The value of a specialist in this work, a man competent to handle emergencies, was accentuated.

Surgery of Specific Diseases of the Rectum.—Dr. George B. Evans, Dayton, Ohio, did not believe this field was thoroughly covered by the syphilograper or the proctologist. He questioned the statement that infection traveled upward from the vulva. It is his opinion that the vast majority of rectal strictures were due to a latent manifestation of syphilis.

Six Cases of Profound Secondary Anemia Due to Bleeding Internal Hemorrhoids and One Case of Necrosis of the Rectum as a Result of Self-Treatment, were reported by Dr. Dwight Murray, New York, who advocated operation at once as the only method to pursue, and that temporizing treatment was unjustifiable.

Spontaneous Intestinal Anastomosis, by Dr. Jas. P. Tuttle, New York, who reported four cases in which the obstruction suddenly gave away. Two of these cases went to autopsy and one to operation, showing a spontaneous lateral anastomosis.

Mesosigmoidopexy, with Report of Two Cases, by Dr. Louis Hirshman, Detroit, Mich.—In this operation the mesentery of the sigmoid was shortened by three rows of catgut sutures, and the muscular band with a little of the gut on each side rolled in to give rigidity to the bowel.

Carcinoma of the Rectum: Comparative Results of Operative Procedures.—Dr. J. R. Pennington, Chicago, illustrated by cases the fallacy of Christian Science in the treatment of this condition.

Primary Melanotic Sarcoma of the Rectum and Anus, with Report of Two Cases.—Dr. Louis J. Krause stated that only sixty cases had been reported in literature. Extirpation is the only treatment, and it must be radical. It may be necessary to remove the sphincters and inguinal glands.

Report of a Case of Foreign Body in the Rectum, by Dr. Lewis Adler, Jr., Phila.—Six years previously patient became pregnant; when six months in the pregnancy the menses returned, but the fetus was not expelled. A persistent diarrhea developed, together with emaciation. About two months before Dr. Adler's examination she passed bones from the rectum. Upon digital examination he detected a large mass connected with the rectum. Under anesthesia a portion of the frontal bones of a fetus was removed. The case was uncertain, but was believed to have been an extrauterine pregnancy.—C. S. W.

**A More Liberal Education for the Medical Student.**—Dr. F. E. Harrington, of this city, publishes in the *Virginia Med. Semi-Monthly* for August 21, 1908, a paper on this subject, read before the Therapeutic Society of this city May 23d. He speaks particularly of education in sanitary medicine. He enumerates more or less of the things that the medical graduate does not know, has not been taught, unless he has had the opportunity of hospital work. Besides, he does not know the ways and means of employing nurses in the home; or about sick-room management; or how to conduct a consultation; and a thousand and one other points. He is not familiar with the laws of the place where he begins to practice, laws that bear on his professional work. Dr. Harrington suggests a subject, "Applied therapeutics," to be taught in the medical schools, which should also include medical ethics and the relations between the physician and druggist; the health regulations; quarantine and disinfection.

**Health Department, District of Columbia.—**

*Memorandum showing the relative prevalence of certain contagious diseases in the District of Columbia from April 1 to August 1, 1907, and April 1, to August 1, 1908.*

*The Act requiring cases of measles, whooping cough, chicken-pox and epidemic cerebro-spinal meningitis to be reported to the Health Department was not put into operation until after April 8, 1907.*

DIPHTHERIA.

| | 1907. | | 1908. | |
|---|---|---|---|---|
| Cases on hand April 1 | 18 | ..... | 25 | ..... |
| Cases reported from April 1 to August 1 | 53 | ..... | 73 | ..... |
| Cases discharged, recoveries | ..... | 62 | ..... | 84 |
| Cases discharged, deaths | ..... | 2 | ..... | 7 |
| Cases on hand August 1 | ..... | 7 | ..... | 7 |
| Total cases | 71 | 71 | 98 | 98 |
| *Per cent. of fatal cases | ..... | 3.1 | ..... | 7.7 |

SCARLET FEVER.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | 26 | ..... | 37 | ..... |
| Cases reported from April 1 to August 1 | 39 | ..... | 72 | ..... |
| Cases discharged, recoveries, | ..... | 60 | ..... | 98 |
| Cases discharged, deaths | ..... | ..... | ..... | ..... |
| Cases on hand August 1 | ..... | 5 | ..... | 11 |
| Total cases | 65 | 65 | 109 | 109 |
| *Per cent. of fatal cases | ..... | ..... | ..... | ..... |

TYPHOID FEVER.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | 40 | ..... | 74 | ..... |
| Cases reported from April 1 to August 1 | 187 | ..... | 252 | ..... |
| Cases discharged, recoveries | ..... | 90 | ..... | 157 |
| Cases discharged, deaths | ..... | 25 | ..... | 35 |
| Cases on hand August 1 | ..... | 112 | ..... | 134 |
| Total cases | 227 | 227 | 326 | 326 |
| *Per cent. of fatal cases | ..... | 21.7 | ..... | 18.2 |

SMALLPOX.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | ..... | ..... | 29 | ..... |
| Cases reported from April 1 to August 1 | 2 | ..... | 60 | ..... |
| Cases discharged, recoveries | ..... | 2 | ..... | 89 |
| Cases discharged, deaths | ..... | ..... | ..... | ..... |
| Cases on hand August 1 | ..... | ..... | ..... | ..... |
| Total cases | 2 | 2 | 89 | 89 |
| *Per cent. of fatal cases | ..... | ..... | ..... | ..... |

*The percentage of fatal cases is based upon the total number of cases which have definitely ended either in recovery or death, and not upon the number of cases reported or the number of cases which have been under treatment.

### Measles.

| | 1907. | | 1908. | |
|---|---|---|---|---|
| Cases on hand April 1 | ..... | ..... | 170 | ..... |
| Cases reported from April 1 to August 1 | 434 | ..... | 562 | ..... |
| Cases discharged, recoveries | ..... | 306 | ..... | 671 |
| Cases discharged, deaths | ..... | 3 | ..... | ..... |
| Cases on hand August 1 | ..... | 125 | ..... | 61 |
| Total cases | 434 | 434 | 732 | 732 |
| *Per cent. of fatal cases | ..... | 0.09 | ..... | ..... |

### Whooping Cough.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | ..... | ..... | 99 | ..... |
| Cases reported from April 1 to August 1 | 157 | ..... | 227 | ..... |
| Cases discharged, recoveries | ..... | 25 | ..... | 90 |
| Cases discharged, deaths | ..... | 10 | ..... | 14 |
| Cases on hand August 1 | ..... | 122 | ..... | 222 |
| Total cases | 157 | 157 | 326 | 326 |
| *Per cent. of fatal cases | ..... | 28.5 | ..... | 13.5 |

### Chickenpox.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | ..... | ..... | 163 | ..... |
| Cases reported from April 1 to August 1 | 161 | ..... | 91 | ..... |
| Cases discharged, recoveries | ..... | 82 | ..... | 216 |
| Cases discharged, deaths | ..... | ..... | ..... | ..... |
| Cases on hand August 1 | ..... | 79 | ..... | 38 |
| Total cases | 161 | 161 | 254 | 254 |
| *Per cent. of fatal cases | ..... | ..... | ..... | ..... |

### Epidemic Cerebro-spinal Meningitis.

| | | | | |
|---|---|---|---|---|
| Cases on hand April 1 | ..... | | 6 | ..... |
| Cases reported from April 1 to August 1 | 7 | | 14 | ..... |
| Cases discharged, recoveries | ..... | | ..... | 8 |
| Cases discharged, deaths | ..... | 7 | ..... | 12 |
| Cases on hand August 1 | ..... | ..... | ..... | ..... |
| Total cases | 7 | 7 | 20 | 20 |
| *Per cent. of fatal cases | ..... | 100 | ..... | 60 |

* The percentage of fatal cases is based upon the total number of cases which have definitely ended either in recovery or death, and not upon the number of cases reported or the number of cases which have been under treatment.

W. C. Woodward.

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# WASHINGTON MEDICAL ANNALS

## APPLIED ELECTRO-PHYSIOLOGY IN ELECTRO-THERAPEUTICS.*

By FRANCIS B. BISHOP, M. D.,

Washington, D. C.

The nerves are constantly transmitting their impulses in various directions in our bodies—according to the function that they are required to perform, the direction of each nerve current being determined only by the character and nature of its end organs. As long as the body is in a healthy and normal condition energy is gathered from without and transmitted from within to the various organs and tissues of the body in a smooth, orderly and painless, if not pleasant way, producing a feeling of comfort and well being. Any disturbance of one or more of these functions produces discomfort, and, if long continued, will produce disease. The first question of importance in considering a disturbance of function with a view to rational treatment is *diagnosis*. After our diagnosis has been made we must next consider the etiology, and, if possible, the pathological changes that have taken place. Is it the motor system of nerves transmitting their impulses from center to periphery, or a sensory nerve, or system of nerves, transmitting their impulses from periphery to center, that are involved? For, according to the function of the nerves requiring physical treatment must our remedies (from a directional point of view) be selected. For it now has been conclusively proven that nerve currents are true electric currents; and common to all the tissues of the body are currents truly electrical and subject to actual measurements by delicate instruments.

The natural electrical currents of the nerves and other tissues of the body are, under normal conditions, true, continuous cur-

*Read before the Medical Society, October 7, 1908.

rents, or, as formally called, galvanic currents. When the tissues are resting, these normal currents are said to be in a state of rest, but upon the contraction of a tissue the action current becomes negative to the rest current, or current of relaxation. These normal currents are usually of small amplitude and intensity, but are subject to variation by stimulation ; the quality and quantity of variation is determined by the time, amplitude and intensity of the stimulus.

Until quite recently we have been taught that electric currents running in the direction of the conduction of the normal nerve current cause an increase in strength of the normal current and thus an increase of function of the organ supplied by the nerves, and that an electrical current running opposite to the normal nerve current would impede its action and diminish the function of the organ it supplies. We can readily understand the importance of this law to the physician who uses physical measures to aid him in the diagnosis and treatment of diseases, especially those modifications of the bodily and mental functions known as nervous diseases. Recently, by a series of ingenious experiments on animal and vegetable tissue, and especially upon animal nerve, Professor Bose, of Calcutta, seems to have very clearly proven that this law of conduction should be reversed—that the normal nerve current is actually intensified when the electrical current is running in a course opposed to its normal conduction—and that the nerve current is impeded when the electrical current is running through the nerve in the direction of the normal current. If the conclusions of Bose, as a result of his numerous experiments, are correct (and it is hard to examine his experiments without believing that they are correct) it establishes a reason for the already-established clinical fact that the positive pole of a moderately-strong current is sedative. As it passes from the periphery towards the center it must travel in line of conduction of the sensory nerves and thereby impede their function. As will be shown later, this does not hold good for all strengths of current ; as all laws must be modified to suit the different cases in so complex and entirely different conditions met with in different individuals. So first of all it is necessary after our diagnosis and etiology are settled, and we find it necessary to use electricity therapeutically to aid us in bringing assistance to nature, that we should endeavor to understand as fully as possible the nature

of our currents, and a subject fully as important (if not more so) is the nature and condition of our patient. For, according to the temperament of our patient must the time, amplitude and tension of the currents that we are to use be selected. In the treatment of nervous diseases by electrical currents it is not easy to imagine a subject of greater importance than that of temperament.

It is necessary to modify the treatment to suit every temperament and all modifications and variations of temperament. In this paper the modern classification is used, in order to avoid confusion. There is, for instance, the nervous temperament, the lymphatic temperament, and a condition about midway between these two called the sanguine temperament, all of which means different peculiarities of constitution and disposition as well as different degrees of response to pain and pleasure. A pain in the nerve of a person of a nervous temperament will be intensified and the general condition of the patient made uncomfortable by a treatment that would be necessary to relieve a pain of the same character and in the same nerve of one of the lymphatic temperament. An amplitude, time and intensity of stimulus that would produce a tonic effect in one of a lymphatic temperament would overstimulate one of a sanguine temperament, and the reaction would come in the form of fatigue. The same time, amplitude and intensity of a stimulus applied to one of a nervous temperament would cause fatigue, and the reaction would be exhaustion. These are facts that I have seen demonstrated clinically, and to my discomfort. Professor Bose, in his numerous experiments upon organic and inorganic matter, has shown that matter is subject to three special physical conditions, which he calls subtonic, tonic and tetanic or tense. When a tissue in the subtonic state is treated by continuous moderate stimulation the first response is that of a positive variation which he calls abnormal; as the stimulus is absorbed the variation changes by a gradual decline of the positive, which goes into a diphasic, and finally into the negative response or normal variation. If the stimulus is kept up for a while longer the response becomes tetanic followed by fatigue and the abnormal positive variation.

A tissue in the tonic state subjected to the same amplitude, time and intensity of stimulus responds first by the normal negative variation, and under continual stimulation passes through all

the phases of the tissue in the subtonic state after the latter has by absorption of stimulus been brought to the state of tonicity.

The tissue already tense, under the same stimulus first goes into a state of tetanus; this is followed by fatigue, exhaustion and the abnormal positive variation.

In the different well defined temperaments we see a condition closely resembling the three physical states disclosed by the experiments of Professor Bose. The lymphatic (subtonic), the sanguine (tonic), the nervous (tense). Professor Bose claims that the nature and intensity of response are determined not merely by intensity of stimulus but also by the molecular condition of the responding substance; further, that a tissue under stimulation of a strong character will undergo a negative variation, and this negative variation is accompanied by a contraction, and in the sensory nerve, pain; that under very mild stimulation the tissue undergoes positive variation, and this positive variation is accompanied by expansion and the absorption of energy, and in a sensory nerve a soothing sensation, or one of pleasure. One must not be misled in believing that this means (necessarily) the application of the positive or the negative pole for the relief of pain. These variation currents are the normal muscle and nerve currents, and may be induced by any form of stimulus; but as they are true electrical currents, and may be measured by a galvanometer, they show themselves to be currents of a true continuous character, and are more easily influenced by electrical currents than by any other forms of stimulation. It is also true that the positive current in moderate strength will produce this positive variation and relieve pain when the same strength of negative current will cause negative variation and intensify pain. Professor Bose, in his experiments upon vegetable and animal tissue, has made some discoveries which to the electro-therapeutist and neurologist should be of great value. He has discovered that the well-established law of Pflueger is correct only with moderately weak and moderately strong currents. After reaching an E. M. F., say, of 220 v., he found the laws of contraction of Pflueger reversed, so that at closure contraction the excitation took place at the anode. At open contraction the excitation took place at the cathode. This, of course, is of very little practical importance to the physician, as he will hardly be called on to use a make-and-break current of such amplitude and

intensity as 220 volts of continuous current. But a question of much importance is the action of the currents at extremely low E. M. F. He found an E. M. F. of from .2 to 1 volt to be irritating with the positive pole, and from 1 to 2 volts and over to increase in its soothing quality; while the negative and, according to Pflueger, the irritable pole was found from .2 to .6 volts to be very soothing and to increase in irritability after the .6-volt point was reached. I have contended for many years that a very mild negative polar action was more soothing to a tender nerve point than that of the positive; this circumstance I have attributed to the belief that the electric current was passing contrary to that of the nerve current and was, therefore, for that reason, impeding the nerve current and diminishing its excitability; but, according to the experiments of Professor Bose and the conclusions drawn from them, one is forced to the belief that such results are due rather to the mild stimulation with its positive variation and soothing effect.

One is naturally inclined to conclude that the varying degrees of motor and sensory activity that we find in different individuals are due to the varying arrangement and different degrees of activity of the molecular elements of their bodies. As all matter responds to stimulus in proportion to the degree and amplitude of the stimulus, as also the molecular condition of the responding substance, it follows that the conditions, varying so greatly in different individuals, and producing the different degrees of (what we call) temperament, are also due to the varying arrangement and degrees of activity of their molecular elements; they are, therefore, differently affected by the varying of time, amplitude and intensity of currents of electricity.

In the light of experience one is inclined to believe that the polar actions in the high intensity of the static machine are as necessary to be fully studied and understood, for the successful and scientific application of that current, as it is that of the continuous current of low intensity. This fact has been impressed upon me in a manner much more forcible than pleasant.

A lady without any organic disease was in an extreme degree of muscular exhaustion and was referred to me for treatment by her physician. She was treated each day, for six days, twenty minutes by the positive unidirectional static current. This current I have called the cumulative tonic method. At the sixth

visit she told me that she was much pleased with her progress, so much so that she had concluded to defer her departure from Washington until she was cured. When she came to me she expected to take only a few treatments before leaving for Philadelphia. I was immediately tempted to try the effect of a change of polarity; consequently at this visit she was subjected to the negative unidirectional current of the static machine, or what I prefer to call "The Cumulative Stimulant Method." At the end of this treatment she showed signs of great fatigue, was confined to her room and bed for several days, and wrote me a very polite note to discontinue her treatments. I have never seen her since.

Two sisters, both of a highly nervous temperament, came to me for treatment. One I found it necessary to treat by the continuous current. She had preceded the other sister by several visits and was showing and feeling a marked benefit from her treatment. The other sister I found it necessary to treat by the cumulative tonic method. In order to save time and space I undertook to treat the two sisters at the same time in the same room. This was done three or four times when, finally one day, to my surprise, the sister that was being treated by the continuous current requested to be excused from treatment; upon being pressed for a reason she said that when treated in the room while the static machine was in action she became very nervous, to such an extent that she was unable to rest during the day or sleep during the night for the next twenty-four hours. I informed her that I fully understood the reason, and that while she might feel some hesitancy, I now felt as though it would be necessary to give her a treatment with the static current. She was then given the same treatment that the other sister was taking, "the cumulative tonic method." In five minutes the effect proved so soothing that she found it difficult to stay awake to the end of the treatment. It may be suggested that this effect was the result of suggestion; perhaps it was, but I think not; one would be more inclined to the conclusion that it was due entirely to different physiological and physical properties of the polar action of the positive and negative frequence of the static machine. In the first instance this patient while in contact with the earth was receiving the negative effect of the current, while her sister on the platform was getting the positive. She became quite enthusi-

astic over the fact that she could take static electricity. Recently, after their summer vacation, these two sisters returned to my office; the continuous-current patient was told that she would be treated in another room. She insisted on going in the room with her sister, stating that her nervousness must have been due to some other cause, as she had taken the static current without trouble. She, of course, did not know of the polarity difference. The two sisters were now treated again in the same room, one on the platform with the cumulative tonic method, the other with the continuous current. At the next visit the one taking the continuous current said that she had made a great mistake; that during the entire treatment of her sister, while she was in the room she felt a tingling all over, and that she had been restless and unable to sleep for twenty-four hours.

There are certain individuals who are so highly strung, whose nerves are always in such a state of tension, that they receive rather unkindly polarity currents of high tension. It is much better, when possible, to treat these patients by the lower-tension currents. There was a time within the experience of many of us (as the transactions of the A. E. T. Association will show) when most of the work done by electricity was with the continuous and induced currents. Some excellent results were obtained by these methods. When the static machine became popular, principally on account of the convenience with which treatment could be administered, the older and more cumbersome methods were largely neglected, but physics and physiology are the same today as ever; we may know more about them now, and will perhaps know more in the future than we do now, still they are and always will remain the same, and cases that are suitable to the influence of currents of low tension will not, as a rule, respond kindly to static treatment.

The wife of a physician friend came last winter to be treated for a troublesome sciatica. I felt that the character of the case called for mild static treatment. She was given a treatment that I have often used in similar cases with success. She took only a few treatments. I, of course, did not know why she discontinued until she came to me again this fall, suffering with cervico-brachial neuralgia. She begged me not to give her static electricity, as she was always made much worse and very nervous by any static treatment. I gave her a treatment with the con-

tinuous current, but persuaded her to take a static treatment next time. I gave her the cumulative tonic treatment ; she said that the treatment was very agreeable, and I thought that she at least could take this treatment with benefit. My hopes were short lived. At her next visit I found that what was a cumulative tonic treatment for many had proven for her a cumulative stimulant effect—she had been restless and sleepless for many hours afterwards. She requested me to go on with the continuous current. At this writing she is still under treatment by the continuous current and says that she is improving.

A gentleman, a neurasthenic of decidedly nervous temperament, was treated by the unipolar positive static current, a spark of only one-half inch passing between the discharging rods. At the next visit he complained that the balance of the day on which he took the static treatment he had experienced such a feeling of fatigue that it was with great difficulty that he remained at his desk.

A lady of nervous temperament, suffering from a peripheral neuritis in the sacro-coccygeal region, following an operation for the removal of the coccyx, was always worse on the days that she was treated by any form of static electricity. She has steadily improved under mild continuous-current treatment.

There are many nervous persons who can take static electricity with benefit. I am thoroughly convinced that there is a great number who are not only not benefited, but are actually made worse by any form of static treatment. This difference I believe to be due to the different kinds and degrees of mixture of the different temperaments. The more purely nervous they are the less they are likely to respond kindly to very high-tension polar activity. In the lymphatic temperament a condition resembling the subtonic state is met with ; here a great deal of energy in the form of stimulus is absorbed before the normal negative variation is reached ; hence currents of greater time, amplitude and tension will be received with benefit by them than is possible to a tissue of higher degrees of tension without harm.

A painful nerve in any temperament is in a state of tension and negative variation, and while practically the same method of treatment may be useful in all, in so far as the relief of pain is concerned, it still holds that different degrees of time, amplitude

and tension must be used in the successful treatment of different individuals in order that we may do the greatest good to the greatest number.

**Dr. Roy** thanked the essayist for the paper. The impression made upon Dr. Roy was that in electro-therapeutics, as in all other kinds of medication, it is necessary to suit the medicine to the patient, therapeutics not being a definite science. He had long been convinced that electricity is a valuable remedial agent, and in the hands of a master like Dr. Bishop will become more valuable with the passage of time. He had been interested in Dr. Bishop's remarks upon the influence of temperament upon electro-therapy; some day we may perhaps have delicate instruments to determine the exact temperamental constitution of patients.

**Dr. Williams** asked Dr. Bishop to specify the exact meaning involved in his remark that there are electrical currents in nerve trunks. Of course there are electrical currents in nerves as in other tissues, but they are not the same as nerve impulse. There was room for confusion in Dr. Bishop's statement.

Did he understand Dr. Bishop to say that functional disuse or disorder may be the cause of disease? Such could not be the case; but the cause of functional disorder might also be the cause of organic change.

It is not usual at this day to speak so much of temperament; the tendency is to use terms and methods that are susceptible of exact measurement. Temperament in a given individual may be whatever the physician happens to say it is.

In some of Dr. Bishop's cases Dr. Williams would like more precise information. Several of those mentioned were easily explicable upon the ground of suggestion. It is well known that the static machine may produce very profound impressions and is very suggestive; also the physician who believes thoroughly in the machine is apt to be able to exert powerful suggestive influences. As a matter of fact, the static machine has been given up by Parisian neurologists except as a placebo; as in Babinski's and Raynaud's large clinics, also, the static machine has been dispensed with. The majority of European physicians believe that the benefit following electro-therapy by the static machine is due to coincidence or suggestion. This is the objection to the estimation of the value of electro-therapy in general; there can be no doubt, however, of the efficacy of the continuous and Faradic currents for the direct excitation of muscles and nerves.

**Dr. Bishop** replied that his statement was meant to convey that there are electric currents in nerves just like electric currents in wires, and that a nerve impulse is an electric impulse; he felt not the slightest doubt about that proposition. There are plus

and minus, positive and negative, variations of electric tension in every process of vital activity.

He had said that functional disorder might be the cause of organic change, and he meant just that; to state that such could not be true, but that the cause of the functional disorder might be cause of organic change, begged the question; functional disorder and the cause thereof being integral parts of a functional disease.

Temperaments have been recognized and discussed since the days of Hippocrates; nothing can be clearer than that they do exist. Notwithstanding that they cannot be separated by exact measurements, individuals in the different classes do react differently, and in applying therapeutics the temperament must be borne in mind. It is even said that the effects of drugs are due to the different ionic arrangement of molecules in the medicaments, and temperament may even here modify action. As to the abandonment of the static machine by Parisian clinicians, he ventured to say that there are not a half dozen good static machines in France, and that Parisian clinicians have not had an opportunity to see the effects to be derived therefrom.

In the case of the two sisters reported, they had had no knowledge of the difference in the kinds of currents applied to them nor of the different effects to be expected therefrom. To his mind there could be no element of suggestion in the results obtained from application of the electricity.

## THE MEDICAL WITNESS IN LUNACY CASES.*

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The paper may be practically and conveniently divided into three parts: First, The medical witness in inquisitions in lunacy; Second, In criminal cases; Third, In testamentary cases.

The medical witness in inquisitions in lunacy in this jurisdiction testifies in open court before judge and jury the reasons for his believing the patient to be of unsound mind. The patient supposed to be of unsound mind is examined by two physicians, who determine whether temporary commitment to the Government Hospital for the Insane is required, either for the control of the patient or for the protection of others. Within thirty days

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after temporary commitment to the hospital, an *inquirendo lunatico* is ordered by the court to determine the legal aspects of the case and whether a necessity for such committal still exists. The patient is present at this hearing, unless his physical condition is such that it would prove detrimental to his health, in which case a certificate to this effect is sent to the court by the Superintendent of the Government Hospital for the Insane. After petition has been filed by the Commissioners of the District of Columbia requesting an *inquirendo lunatico* by the court, an alienist is authorized by the executive authority of the said District to examine and testify in court in regard to the present mental condition of the patient sent from the District to the said hospital, and if the patient is not produced in court the reason for his inability to appear is testified to.

The present law should be so altered that a patient should be detained at the hospital for care and treatment; if the patient's mental condition is such that he is unable to advise counsel, or if he is suffering from an acute psychosis that would be aggravated by the court proceedings, he should not appear. Also, if temporary commitment was extended from the present thirty-day limit to ninety days, during which time legal proceedings could be instituted, and the matter brought to the attention of the court, much good would be accomplished. It would give the Board of Charities time to locate and return to their homes non-residents, without the misfortune of "insanity" resting on these cases; also many cases of acute insanity would recover within that time and be discharged by the Superintendent, the family and friends being thus spared the stigma and exposure of a court trial and a dear and loved one being legally declared of unsound mind. The degree of trouble the insane patient causes outside an institution, together with the inability of his family or friends to give the needed care, or to relieve his family of too great a burden and responsibility, should determine the commitment. The medical witness makes a good appearance in this friendly hearing in which the wishes of friends and family are given consideration, and the best efforts of the court are directed to the patient's ultimate good.

In criminal cases, the judges are most painstaking in giving the defendant before them the fullest benefit of the insanity plea in palliation of his offence and in mitigation of his punishment.

The treatment that the insane person receives at the hands of the law begins from the moment of his arrest until he is serving his sentence in prison. Proved insanity in the defendant puts a stop to all criminal proceedings against him, at whatever stage of the proceedings the insanity is observed; if after being charged and before commital, he is not committed; if after he is committed for trial and before arraignment, he is not arraigned; if after arraignment, he is not tried for the offence with which he is charged; but in each instance is sent to the Government Hospital for the Insane. On regaining his sanity he would be certified as recovered by the Superintendent and would again as a defendant come under the court's jurisdiction. At his trial he may put in a plea of insanity and the jury's verdict may be "not guilty by reason of insanity." On recovery of his sanity after this verdict, the law having no further hold on him, he is discharged a free man. If found of unsound mind after trial, he is not sentenced, or if he becomes insane while under sentence or while serving time he is committed to the Government Hospital for the Insane until he regains his sanity, when the law again takes charge of his person. In police court cases the attending physician to the United States jail requests an alienist to see alleged cases of insanity among the prisoners, and as a result of this joint examination a report to the presiding judge or the Department of Justice is made for its guidance, and such advice is invariably followed. The procedure in the criminal courts is as follows: The district attorney's office requests of the Department of Justice the power to employ alienists, who testify at the trial in regard to the mental condition of the defendant. If they believe the defendant to be of unsound mind the Government may turn the witnesses over to the defence, or on examination this fact will be disclosed. If the defendant, for financial reasons, is unable to employ alienists, the court directs that one or more shall be assigned him. It is the duty of the district attorney's office to secure the attendance of the necessary witnesses and to take steps to ensure that the whole of the evidence of the sanity of the defendant is fully brought before the jury.

In my opinion, a law should be framed providing that a commission, consisting of the attending physician to the United States jail, the Superintendent of the Government Hospital for the Insane and one or more alienists should be appointed by the

Supreme Court of the District of Columbia to examine every case in which the defendant is under serious charges, and that a written report be made to the presiding justice concerning the defendant's mental condition. If the defendant objects to this examination it should take place after conviction and before the prisoner is sentenced.

In examining an alleged insane person a medical witness should provide himself with writing materials and take down the person's statements in the person's own words and in his presence, at the time the words are uttered. Not only is this the only way of insuring the accuracy of the report, but it gives the examiner the right, which otherwise he could not have, of consulting his notes in court. The things contained in this report should be facts, not inferences from facts. The only things that can be recorded as facts are how the person appears, what he says, and what he does. A delusion cannot be observed, defect of memory cannot be observed; morbid desire, confusion of thought, lack of knowledge, etc., are all hidden from observation; they may be inferred from what the person says or does, but observed they cannot be. To the jury one little delusion is of far greater importance than a weakened mind. The terms emotional insanity and moral insanity are each excluded in this jurisdiction. In cross-examination as medical witnesses you will most need self-possession. You are entitled to have the question put clearly; are under no obligation to answer "Yes" or "No" to a question which does not admit of such an answer without conveying a false notion of your meaning; you are entitled to qualify your answer as much as you please in order to make it convey your meaning accurately; you cannot be interrupted by counsel while replying to a question. Make your answers short, simple and plain. Always remember that your knowledge of the subject is superior to that of the best-coached lawyer. You are sworn to tell the truth, and the whole truth you must tell when you are asked, no matter what the consequences may be.

In testamentary cases it may be held as proved by legal decisions that a less amount of mental capacity is needed for making a valid will than for managing property or enjoying personal liberty. Patients in asylums have made good wills during remissions of their disease. Wills of patients with insane delusions that did not affect the provisions of the will have been held valid.

Easily controlled persons have made good wills; persons at the point of death and those immediately before committing suicide have had their wills upheld. In examining the testamentary capacity of a person to manage property or make a will the physician should insist on seeing the patient alone, and then ascertain if the person is free from the influence of drink or drugs and in his usual state. Does he know the nature of the act he is to perform or the effect of the document he is to sign? Find out if he is influenced in the doing of it, or in regard to any of its provisions, by insane delusion or by an insane or morbidly enfeebled state of mind. Ascertain if there is weakened mind from bodily disease, intemperate habits or from undue influence being exercised. Impress on *acting* lawyers to make wills that may be *questioned*, short, simple and free from technicalities. It is stated, by a distinguished English counsel with a large experience in the probate court, that no will has been upset where a reputable doctor had witnessed it after examining into the testator's state of mind and an agent of repute had drawn it up, neither of them taking any benefit under its provisions. Make such an intending testator go carefully over the partlculars of what disposition of his estate he wishes made, without prompting, suggestion or leading question, twice, with a quarter of an hour's interval between the two statements. Ascertain, if possible, from him if he had intended before his illness to will his property as proposed and for how long a time before. Try to get independent testimony from others on this point. In examining persons it is very desirable to be perfectly impartial, to make no suggestion as to the propriety of the act or the settlement to be made, and on no account to influence the testator as to the disposition of his property.

In concluding this paper, which is an expression of my personal views gathered from a not too limited experience in medico-legal work, it seems but fitting to express my opinion in regard to the hypothetical question. The question originally consisted of the salient features of certain facts established by the evidence of ordinary witnesses, and admitted by the court, fitted to an imaginary person, the alienist giving his opinion that such a person under the conditions stated in the question was either of sound or unsound mind. The advocates cull the points advantageous to the side they represent, omitting those facts that are opposed to their side of the case. The question, as at present

propounded, should be abandoned, as it has done more, probably, than anything else to detract from the value of the medical witness, to make him an object of derision to the public, and his testimony the torn and ragged plaything of litigants and contestants. It is unscientific, and the physician as well as the lawyer should use his best efforts to secure such alterations of the law that all the facts *pro* and *con* in the case in question would be submitted to a commission of alienists whose duty it would be to make a written report of their findings and act in an advisory capacity to the court.

The hypothetical question is valid and legal, and will probably continue to be used ; but if the witness will insist on having all the obtainable facts upon which this question is based placed before him, including the person, if possible, whose mental state is in question, and, by conscientiously endeavoring to sift the chaff from the wheat, compel the hypothetical question to be built on the foundation of truth, the alienist's reputation and power for good in the community will be greatly enhanced, and he will gain the respect of the judge and the confidence of the jury.

**Dr. Woodward** said that he had enjoyed the paper and agreed in the main with what had been said. It seems ridiculous to hear judges and lawyers speak derisively of disagreements of medical experts, when in every litigation there must be lawyers representing opposing views as to law or equity. It would be desirable to improve the status of the medical witness, however, and the appointment of an impartial commission to guide the judge to an opinion as to the mental state of the individual at bar, as suggested in the paper, might be advisable. The blame for the present system must not be laid entirely upon the lawyers, for they are paid to make the best possible defence under the law. The blame properly belongs to those who make the laws of procedure and evidence. There might be no difficulty in providing for the appointment of a lunacy commission for the purposes of the prosecution; but it seemed to him very doubtful if the defendant in criminal causes, or either litigant in civil suits, could be denied the right to summon any expert witness who might be favorable to his cause. A plan to meet these difficulties had been suggested some years ago but had never been acted upon, viz : 1st. There should be a showing to the court that expert evidence is necessary ; 2d. When thus shown, it should be the judge's province to appoint a commission from a list of experts furnished by the representatives of the two sides of the

litigation; 3d. Review by the appellate court of the inferior judge's choice of experts.

As to the examination of the patient, the making of records and the actual testifying in court, he had nothing to add to what Dr. Hunt had said. Dr. Woodward's observation in the courts of the District led him to believe that on the whole the medical witness is treated with fairness and reasonable courtesy by the local bar; at times disagreeable episodes may arise, but it must be remarked that often as not the physician brings trouble upon himself by the attitude he assumes on the stand.

**Dr. T. C. Smith** said that the recent records of the conduct of medical experts in celebrated criminal cases had led him almost to the point of believing that the proper place for the psychiatric witness is in the penitentiary. His remarks did not, of course, apply to Washington; we all know that everybody here is honest. Speaking seriously, however, he believed that no other such harm has been done the profession as by the expert witnesses in lunacy cases; in every case whatsoever, provided there be enough money to pay for it, there may be found opposing experts, ready to swear to what the lawyers pay them to swear to. In a recent notorious case, we have had the spectacle of a mother called to the stand to swear that her son was insane before his very birth; psychiatrists swore that he had never performed a rational act from his birth to the moment he perpetrated murder; and yet these same psychiatrists are ready now in a few short months to testify that he has since his trial become sane again. Physicians are standing in their own light by aiding a prisoner to escape just punishment. If from no other standpoint, the physician is at a disadvantage in such cases because his dictum is the real aid to the prisoner, and still the lawyer beats the doctor ten to one in the fees obtained. Dr. Smith believed that the only fair way to dispose of such matters is to have competent medical opinion merely as advisory to the judge. There can be no fairness in a method which allows medical experts to coach lawyers as to what questions to ask and lawyers to coach physicians how they shall answer.

**Dr. Hickling** said with regard to Dr. Hunt's suggestion that the period of thirty days, at present allowed for the appearance of an alleged lunatic in court, should be lengthened to ninety days; that under the law at this time, the court may at discretion extend the time another thirty days, and upon showing of continued inability of the patient to appear in court, may again extend the interval before trial. With regard to Dr. Hunt's plea for detention without commitment in temporary insanities, cases may now be restrained upon certification by the Health Officer pending recovery. To correct misapprehension of the celebrated criminal case mentioned by one speaker, he said that in the first trial of this prisoner the question of his sanity was not raised in

defense, but when his mental capacity was questioned by an alienist, a commission was appointed to inquire into his ability to confer with his counsel.

The whole situation of the expert medical witness seems very unfortunate ; much of the trouble may be with the physicians themselves. The law seems good ; insanity constitutes a good defense, and counsel must present reasons and witnesses to prove insanity. On the other hand, opposing counsel has the right to seek to controvert evidence about which any question may be raised. Then it is not for the court, but for the jury to decide upon the merits of the evidence adduced. For the court to appoint a commission to decide whether a prisoner was insane or not would be to infringe upon the prerogatives vested in trial by jury. It does seem, however, that the judge should be aided in arriving at an understanding of the technical questions involved ; where a case under trial hinges upon the question of insanity, it might be well to refer the whole question to another court composed of disinterested experts.

The hypothetical question is much misunderstood; it is merely for the purpose of getting the correlated evidence before the jury. The facts as to the actions and history of the patient may have been gleaned from many witnesses in a disorderly and fragmentary way; the hypothetical question is intended to include all these facts arrayed in an orderly and significant way, and to elicit a succinct expert opinion as to the mental state of an individual to whom these facts applied. The jury has a right to be thus informed; this is the only excuse for expert testimony. If, however, counsel seeks to inject unestablished facts into the hypothetical question, then it becomes a two-edged sword.

One of the reasons for the present unsatisfactory status of expert witnesses is the mistake the courts make in allowing inexperts to qualify as experts.

**Dr. Williams** said that Dr. Hunt's presentation of the subject should be of great service in giving important information upon a question of some difficulty to most practitioners. There were two distinct points to which he wished to refer : 1st. Venality of experts, which had been already discussed ; this has been obviated in France by the appointment by the court of a commission of real experts. When a doubtful case arises, it may be referred at the court's option to a committee of one or three experts ; this committee examines the patient, makes a written report of its findings, causes the report to be read in court, and is cross-examined by counsel. All chance of venality is thus avoided. 2d. What degree of insanity is sufficient to excuse a criminal act ? French jurisprudence recognizes what is called attenuated responsibility ; while some insane criminals must be excused altogether from their criminal acts, others occupy a mid-position, where it is very difficult to arrive at a just appreciation of what

degree of attenuation exists. Should the physician be asked for judgment as to the degree of attenuation? Should not his judgment be limited to diagnosis, prognosis and recommendations of treatment? Should not the judge decide the degree of attenuation of responsibility?

It seemed to Dr. Williams that the symptom "loss of memory" might properly be regarded as appreciated by observation, despite Dr. Hunt's restrictions to the use of the term. It also seemed that as important to the medical witness as self-possession is knowledge; perhaps that item had been taken for granted by Dr. Hunt.

**Dr. Robins** said that the courts of St. Louis have been aided for the past eight years by the services of a lunacy commission, of which Dr. Sydney I. Schwab is chairman. Part of the time this commission served gratis; its work has been eminently satisfactory.

**Dr. Hunt** thanked all the gentlemen for taking part in the discussion. He had been disappointed at the absence of Dr. Wm. A. White; his participation in the discussion would have been interesting. Dr. White agrees with Dr. Hickling in regard to the hypothetical question. Dr. Williams' remarks upon attenuated responsibility had been interesting; in this jurisdiction an opinion must be confined to the person's ability to know the nature and quality of his act, to distinguish between right and wrong; knowing the act to be wrong, his inability to control his own conduct, through no fault of his own. Dr. Hunt had at times been embarrassed by the conviction that the patient should be dealt with leniently; on such occasions, he had always found the judge willing to consider his opinion upon this point.

There is at present a commission empowered to investigate and report upon the conditions of penal institutions, etc., in the District; in the report of that commission, Judge Stafford will probably make recommendations looking to the improvement of the status of medical testimony.

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A MEDICAL STUDENT who prided himself on being a humorist was running down the steps of the hospital which he was "walking," when he met a fellow student. "Hello, Brown!" cried the latter, noticing that his friend looked pleased. "You're in a hurry. What's the matter—any good cases?"

"I should think so!" cried Brown. "We've got a woman in the ward upstairs who is so cross-eyed that the tears run down her back!"

"Bless me!" said the friend. "You can't do anything for her, can you?"

"I should think we can—in fact, we have," cried Brown; "we've treated her for bacteria!"—*Philadelphia Inquirer.*

# CHRONIC NEURALGIA; ITS CAUSE AND CURE.*

BY ROBERT REYBURN, A. M., M. D.,

Washington, D. C.

It must be remembered that in speaking of the cause of neuralgia, in the present paper, I refer more especially to the chronic form, and not to that dependent upon acute or local causes.

Probably every physician in active practice knows by a foreknowledge, born of repeated experiences, that when the atmospheric conditions are favorable to its development, there exists a class of patients who, he feels certain, even before he visits them, will be suffering from some one or other of the protean forms of neuralgia.

In other words, a glance at the barometer, showing, it may be, the fall of an inch in the mercurial column, will enable the doctor to prophesy to himself, the chronic invalids among his patients, who will, when he makes his daily round of visits, complain either of exacerbations of the old pains or of new developments of neuralgia.

Now is this condition of things, so constantly occurring, merely a coincidence, or is it dependent upon a cosmical or universal cause that can be traced by its effects?

I do not think that this can be a coincidence, for it recurs entirely too constantly to be susceptible of such an explanation.

It will be my endeavor to attempt to give the reason why neuralgia is coincident with the fall in the mercurial column or, what is the same thing, exists with the diminution of the pressure of the atmosphere.

Dr. S. Weir Mitchell, in his very instructive and valuable article published in *The American Journal of the Medical Sciences*, for April, 1877, p. 305, has shown that when the atmospheric pressure is lessening and the mercury is falling, the neuralgia occurs during the fall of the mercurial column and before it is complete.

He also states that every storm as it sweeps across the continent, moves upon the storm center of greatest depression of the

*Read before the Medical Society, October 21, 1908.

barometer like a bead upon a string. The rain precedes this greatest depression of the barometer, being in advance of it 350 to 600 miles.

Before and around the rain storm lies the neuralgic margin, or border of the storm, and which precedes the rain storm by about 150 miles.

The facts above stated can be easily demonstrated by the records of the Signal Office, and assuming their correctness, I believe that the following is a simple explanation of the connection between these phenomena :

*Ganot's Physics*, Am. edition, p. 107, says that the superficial extent of the surface of the body of a man of medium size is about 16 square feet ; the total amount of atmospheric pressure on the surface of the body is consequently about 35,000 pounds (34,560).

Taking the average height of the mercurial column as 30 inches, a fall of only one inch shows that 1-30 of the pressure of the atmosphere, or more than half a ton, is for the time being removed from the surface of the body, and a fall of less than two inches will remove a ton of pressure from the surface of the body.

The heart, it must be remembered, aided by the contractions of the blood vessels, is pumping the blood through the system with the same, if not greater, force than when the air is in its densest condition.

The necessary result of this condition of things is that a much greater pressure is exerted upon the blood vessels, and more especially upon the smaller arterioles and capillaries, and which, from the sparsity, and in the case of the capillaries the entire absence of muscular or elastic fibers, in their walls, are ill-adapted to withstand such increased pressure from behind.

If the strength of the coats of the smaller blood-vessels or their contractile power be diminished by the malnutrition of anemia, or in fact, by any condition of the body which deteriorates the general health, the vessels passively yield to a certain extent and become overfilled with blood, and we have then the condition known as passive hyperemia.

But the mischief done does not end with the hyperemia ; these engorged blood-vessels are accompanied and surrounded by an enormous development of nerve filaments, which are pressed upon, and being functionally disturbed by this pressure, we have

as a necessary sequence, the development of neuralgic pain in the part.

Certain conditions, which may now be mentioned, act powerfully in aiding the development of neuralgia, as, for instance, cold, especially when combined with moisture. The reason, no doubt, why cold and moisture combined act so much more promptly in the production of neuralgia than the same amount of exposure to air, is that moisture greatly increases the conducting power of the air to convey the animal heat away from the body.

In Arctic regions, for instance, the human body will resist even lower temperatures than that at which mercury freezes (40° below zero), provided the air is perfectly dry and still; but should the air become a better conductor, either by becoming moist or by the wind beginning to blow, and thus conveying the heat of the body away faster than it can be kept up by the vital processes, death will ensue from even a short exposure.

We find also, other things being equal, that neuralgia chiefly affects those parts of the body that are abundantly supplied with a vascular net-work, and which are unprotected by clothing, thus exposing them to changes of temperature.

This explains why so many cases of neuralgia are found existing upon the parts of the face supplied by the the fifth or trifacial nerve.

The obscure pains so commonly observed before storms in old wounds, inflamed joints and other organs, which are commonly referred to rheumatism, are easily explicable by this theory of increased vascular congestion; the vessels in chronically inflamed parts are always enlarged, and the diminished atmospheric pressure upon the outer surface allows the vessels to become more dilated, and hence pain is produced.

*Treatment.*—The remedies that are generally used in neuralgia, and to which we all naturally turn, are opium and morphia.

Now these remedies resemble what Sir Walter Scott said of the pursuit of literature for a livelihood: they make an excellent staff, but ought not to be used as crutches. In fact, the habitual and continuous use of morphia and opium as it is so often given to chronic invalids in neuralgia is a most dangerous and reprehensible practice, and is ruinous to the physical and moral well-being of the patient.

The temptation is very strong to every physician to relieve his cases, as he can, rapidly and certainly, by the use of his hypodermic syringe or giving internally his dose of morphia, but he ought to remember that this is a potent remedy and one which injures the tone of the nervous system if too frequently given.

Morphia and opium are then, from this standpoint, not curative so much as palliative; they no doubt act by benumbing the sensory filaments of the nerves by inducing sleep, thus allowing the nervous force time to be regenerated.

The power over involuntary muscular fiber, which opium and its alkaloids exert over the circular muscular fibers of the iris, and probably over other parts of the body, may be an important factor in its use in the cure of neuralgia. Next in importance to opium in the treatment of neuralgia naturally comes the group of anesthetics, which includes the alcoholic beverages with sulphuric ether, chloroform, hydrate of chloral and paraldehyde. Alcohol is a potent and powerful remedy in neuralgia; to be efficient it must be given in large doses, and is then a true anesthetic, benumbing and destroying the pain, and thus inducing sleep.

While acknowledging the potency of alcohol, ether, chloroform and hydrate of chloral, etc., in neuralgia, yet their use when continued for any length of time is accompanied by so many grave dangers as to greatly limit their usefulness.

Quinine is not in any appreciable degree an anodyne, and yet no remedy is given more frequently or with greater benefit than this powerful drug in cases of neuralgia.

How does quinine relieve in curing neuralgia? I believe it acts in two ways. First, and chiefly, by its powerful tonic influence upon the vaso-motor system of nerves, controlling the circulation in the blood vessels, thus enabling them to resist the *vis a tergo* which tends to over-fill them and causes them to press unduly upon the sensitive filaments of the nerves in contact with them. This tonic power, as has been noticed by many observers, does not pertain in any great degree to the other alkaloids of cinchona.

This may explain the fact that while these alkaloids are nearly as efficient as quinine in curing intermittents, yet they fail almost entirely in curing neuralgia. Cinchonidia especially, which is a good antiperiodic (five grains being equal in my experience

to about three of quinine), has, in large doses, a very debilitating action upon the circulation.

Many experiments in the exhibition of cinchonidia, both given to patients and myself, have convinced me fully of this fact.

I had a striking experimental illustration of this in my own case, during an attack of intermittent fever of tertian type. I took within six hours about fifty grains of cinchonidia sulphate in divided doses, and it produced such a depressing effect upon the circulation in the blood-vessels as to considerably alarm me. The pulse became feeble and sometimes intermittent, and I was compelled, for twenty-four hours, to retain the recumbent position, as any effort to assume an erect position brought on an attack of syncope. Sleep was impossible ; the moment I closed my eyes I saw, projected upon the walls of the room, all the pictures of scenes I ever had seen, read or dreamt of during my previous life. These symptoms gradually passed off as the system came out from under the influence of the drug.

The potent influence that quinine exerts in controlling all diseases assuming a periodical type is, of course, the other way in which quinine is useful in neuralgia, and it is in that class of cases of neuralgia, especially, that quinine produces such brilliant and happy results.

The next remedies generally found useful in neuralgia are those which act by diminishing the force of the circulation, either through the nervous system, as bromide of potassium and veratrum, or by their direct sedative effect upon the heart and blood-vessels, as aconite and gelseminum.

My view, therefore, of chronic neuralgia is that it is due to a purely physical cause, viz : increased blood pressure, and that all the remedies which relieve neuralgia act either as the anodynes do, by benumbing the sensory filaments of the nerve or by diminishing the force of the circulation, or by aiding the blood-vessels to resist the pressure upon them. The pains of old wounds, of chronically inflamed joints, of the stumps left after amputations, are all susceptible of similar explanation.

There is one remedy not yet mentioned, that I have given on theoretical grounds with excellent results, and that is ergot in full doses. This is especially useful in the variety of chronic neuralgia occurring in over-fed women, in the higher walks of life, who take little or no exercise. This often takes place dur-

ing or after the menopause. These people are often fat, yet flabby, indolent, prone to dwell upon their ailments, and it requires all the tact and skill that the physician possesses to manage their cases successfully. Enforced exercise and a diminished supply of food, with the use of ergot in doses of a fluid drachm three times a day, will be found very efficient. Where the above treatment fails, I have found drastic purgatives, and the abstraction of blood by leeches or cups, to be a most admirable method of treatment.

These patients are not suffering from anemia. They are more properly suffering from an over supply of nutritious materials in the blood, and need really a less amount of nutriment and a reduction in the volume of the blood. Let us think for a moment what must occur to a woman at and after the menopause. For twenty-five or thirty years a periodical flow of blood has taken place, which has now ceased; the supply of nutriment and waste of the body in other respects, perhaps, continue about the same; more blood is formed than the organs of the body need, or can assimilate, and hence we may have chronic neuralgia as one of the evils that may develop from the increased blood pressure.

But this article would be, indeed, incomplete if attention was not called to the true curative treatment of chronic neuralgia, which must, to a great extent, be carried out after the paroxysm of pain has ceased.

The treatment dwelt upon in the early part of this article is only directed to the removal of the prominent symptom, which is the pain. The true *curative* treatment of neuralgia is to improve the general nutrition of the patient. It is scarcely necessary, in speaking to medical men, to dwell upon the value in such cases of iron, cod liver oil, and an abundant supply of easily-digested fatty food. The treatment proper of chronic neuralgia is, in fact, the placing of the patient under proper hygienic conditions. I do not believe we have done our duty to our patients, unless we not only prescribe for the attack of pain, but also endeavor to remove the causes which induce it.

In directing the administration of nourishing food, of exercise in the open air, of plenty of sleep, we are doing our work as physicians just as effectually as if we gave all the drugs of the pharmacopoeia.

**Dr. Hunt** said that it had been a pleasure to hear Dr. Reyburn's paper. Dr. Hunt had had the privilege of knowing the patient referred to by Weir Mitchell in his account of the influence of barometric pressure upon neuralgia; this patient was Capt. Robt. Catlin, U. S. Army, who collaborated with Weir Mitchell in formulating the theory that a combination of low barometer, a high degree of humidity and a falling temperature were responsible for outbreaks of neuralgia. He differed from Dr. Reyburn as to the direct causation of neuralgia, believing that the condition is usually due to disease of neurons, either peripheral or in the spinal cord, whether of the upper or lower segment.

The treatment is difficult; the cause must be found and, if possible, removed. Constipation is an important factor to be reckoned with. The upbuilding of the entire system must not be neglected. Climate undoubtedly has considerable influence upon the attacks, both as to frequency and severity. Galvanic currents are frequently used for their sedative influence. The effects of alcohol injections in neuralgia are by virtue of the escharotic action of the alcohol. Malaria may often be found the underlying cause of neuralgic pains, and, curiously, in such cases the administration of Warburg's tincture is more efficacious sometimes than the use of quinine alone.

**Dr. Syme** was much interested in the subject of neuralgias, but particularly in that form known as *tic douloureux*. It is well known that drugs which prove efficacious for the relief of one case fail in another; if, as Dr. Reyburn thinks, the painful attacks are due to congestions around nerve trunks, drugs should act alike in all cases. The contrary being true, Dr. Syme was disposed to doubt the etiological agency of congestion. The use of alcohol injections for the relief of ordinary chronic neuralgias is disappointing; the effect of the injection disappears in the course of about three months. The causative position of intestinal toxemia in neuralgia is undoubted; great good may be accomplished by the use of copious hot enemata and salol.

**Dr. Roy** said that Mr. Haig explains the effect of barometric pressure upon the incidence of neuralgic attacks by the influence of atmospheric pressure on uric acid metabolism, having observed that some individuals would be seized with an attack of neuralgia upon climbing to the heights of the mountains, while others would be attacked upon descending. In either case metabolism is at fault, the disturbance being precipitated by circulatory changes due to changes of air pressure.

**Dr. G. Lloyd Magruder** said the influence of intestinal disturbance upon neuralgia should be insisted upon. The connection between mental stress and emotion and neuralgic attacks may best be explained by the inhibitory effect of emotion upon digestion and the opportunity for intestinal fermentation and putre-

faction thus occasioned. He gave several instances in which this connection was well demonstrated. He thought that Dr. Reyburn had covered all points admirably, but he wished to insist upon the part played by modern stress in the causation of neuralgia.

**Dr. Reyburn** was particularly anxious to emphasize the importance of looking beyond the pain to the ultimate cause, which may be one of the very many. It is essential to study the individual case; usually the fault may be laid upon some defect of a special organ or upon bad hygiene. Practice limited to mere consideration of the pain leads to the administration of opium, a dangerous drug, and to be avoided as long as possible. As to the actual production of the pain, the influence of the barometric pressure has been observed time and again, and is demonstrated by the certainty with which neuralgia victims can predict the approach of a storm. A zone of low barometric pressure immediately precedes the path of a storm; as the storm approaches the barometer begins to fall and neuralgic attacks occur; as soon as the storm breaks the barometer attains its normal level, the blood vessels regain their tone, blood pressure is equalized and the pain stops. There may be a difference of 1,000 pounds surface pressure before and after a storm.

## CASE OF EPITHELIOMA OF UTERUS.*

By D. S. LAMB, A. M., M. D.,

Washington, D. C.

The uterus and appendages of a woman 23 years old who was admitted to hospital and died at night the same day. Her temperature was 99.5; she had some bleeding from the vagina and the right thigh was persistently flexed, suggesting hip-joint disease. She was somewhat emaciated.

I was asked to make a post mortem examination to determine the pathological conditions. I found the abdomen full of pus and the abdominal viscera generally adherent by recent adhesions. Intestines somewhat distended with gases. The thoracic organs were normal. The liver and spleen somewhat anemic but otherwise showed no disease; the kidneys showed cloudy swelling. There was an old partly-calcified enlarged mesenteric gland.

*Reported, with specimen, to the Medical Society, October 28, 1908.

In the right side of the true pelvis was a swelling from which exuded pus, and this place was no doubt the focus whence came the general purulent peritonitis. This swelling extended over the pelvic brim into the right iliac fossa and upward behind the cecum, and contained a good deal of pus; the pus was not feculent.

The pelvic organs were then examined. The uterus was somewhat larger than normal; in the fundus was a fibroid; the cervix was irregularly ulcerated, and the ulceration extended up along the uterine canal. The canal contained pus. The tubes were normal, or nearly so; the right ovary did not show disease; the left ovary, in removing the specimen, was left behind.

Microscopical examination of the cervix by Dr. J. S. Neate, of the Army Medical Museum, showed an epithelioma. It would seem, therefore, that the suppuration in the pelvic and iliac lymphatic nodes was through infection from the ulcerated surface of the uterus. Microscopical examination of the pus showed a number of bacteria, but no tubercle bacilli, which was decisive that the glandular involvement was not tubercular. The peculiar position of the thigh was doubtless due to the pressure of the iliac swelling.

**Dr. H. D. Fry** said that this specimen was unusually interesting on account of the early age of the patient and the very uncommon mode of termination.

**Dr. G. Brown Miller** said that it was so unusual to find either carcinoma or fibroma at the early age of 23 years that the concurrence of the two conditions in this case prompted the inquiry whether there could be any mistake in the age; colored persons are apt to be inaccurate with respect to their birth years. Dr. Lamb's explanation of the fatal issue in this case was no doubt correct; there had been sufficient ulceration of the carcinomatous growth to allow the escape of infection into the parametric lymph spaces and thus to the peritoneum.

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Force of Habit.—Pastor (to druggist convert at the altar): "Brother, have you the hope of eternal life?"

Druggist (absentmindedly): "No, sir, but I have something just as good."—Dr. H. B. Reed.

# THE DIFFERENTIAL DIAGNOSIS OF FUNCTIONAL FROM ORGANIC FORMS OF MOTOR DISABILITY.*

By TOM A. WILLIAMS, M. D.,

Washington, D. C.

On the last occasion when the honor of addressing the Medical Society of the District of Columbia was extended to me I took occasion to sketch the recent progress in a field of practical clinical medicine hitherto neglected by most clinicians on account of the technical difficulties. I showed how these difficulties of examining disorders of the sensibilities had been smoothed away; and had the pleasure of demonstrating a large number of pictorial illustrations for which the subject was well adapted.

The subject I have chosen on this occasion, though often complex, is one with the difficulties of which each of my listeners must have been faced; for whereas the method of detecting alleged disorders of sensation is often erroneously believed so fallacious as to be hopeless, on the contrary, every clinician believes himself capable of appreciating disorders of motility. While this is true, the important question in any case of motor disability is to determine its pathogenesis; and this often requires diagnostic methods of great delicacy and considerable experience in the technique of their application, as well as a knowledge of the anatomy, physiology and pathology of the nervous system, which few have time to attain.

The matter does not well lend itself to pictorial illustration; and for its presentation by clinical examples more time would be required than I have at my disposal tonight. However, by this time I have collected a considerable number of cases illustrating the points I am going to discuss, and, should any of my hearers wish it, I shall be gratified to arrange a clinical demonstration for their benefit.

My subject is "The Differential Diagnosis of Functional from Organic Forms of Motor Disability;" but tonight, on account of the limitation of time, I must omit almost all but those of cerebral origin. I shall, therefore, consider in order: I. Hemiplegia; II. Paralysis agitans; III. Tics and spasms of the face and neck, and occupation cramps; IV. Pseudo-bulbar palsy and

* Read before the Medical Society, October 28, 1908.

the spasmodic laugh and cry; V. Apraxia and aphemia. The subject will, however, be gone into more fully in the current and subsequent numbers of *The Archives of Diagnosis*, and those readers who wish to pursue the study are referred thereto.

Nothing in the practice of medicine is more important than the ability to distinguish palsy purely functional, whether psychic or not, from that due to destruction of nerve tissue; for the appropriate treatment of the former variety will obviate the years of disability and suffering which so many unfortunates have undergone through want of diagnostic knowledge on the part of the physicians they have consulted.

At the Congress of Lille[1], I endeavored to show how often and in what manner diseases were, if not produced, at least perpetuated by ill-directed statements on the part of medical advisers. I showed how a motor disability induced temporarily by a shock, fright, or even by physical trauma or evanescent disease, was often fixed in the patient's mind by an exaggeration of its gravity, the patient's preoccupation with his state being fortified by the doctor's tactless suggestion.

But it is an equally serious fault to minimize the gravity of a lesion to cheer up a patient, and to appeal to his will power when he is functionally disabled on account of organic destruction of tissue, or even by temporary paralysis of nerve centers or interruption of nerve paths by edema, infection or intoxication. Hence the supreme importance of correct diagnosis of the cause of paralysis.

A good illustration of these points was afforded by a case recently seen with a leading physician of Washington. It was that of a young married woman who some years before had undergone ablation of the appendages at the hands of a gynecologist of international fame, who was stated to have been treating her also for syphilis on account of a right hemiplegia and aphasia. The symptoms had ceded in about six months, and had not recurred until a few days before I saw the patient. I found her lying in bed totally unable to move the arm or leg, which were, however, flaccid and anesthetic. She suffered no pain; there was no hemianopsia, ataxia, nor trembling. I could therefore exclude a lesion near the thalamus, which never causes complete powerlessness and is always accompanied by some of the foregoing symptoms. The anesthesia, at least, was probably, therefore,

hysterical, but organic disability is very frequently augmented by additions arising from suggestion of further disability by the mind of the patient or others.

Though the patient expressed inability to sit up, she sat up when urged, ostensibly to test the patellar reflexes. The muscles of the abdomen and pelvic girdle were then seen also to contract coördinately along with their contralaterals, though quite unable to perform ordered movements alone. This never occurs in complete palsy by organic interruption of nerve paths, and was therefore a positive sign of hysterical palsy.

There was no means of testing the peculiar trepidating and clasping grasp of the truly palsied hand of hemiplegia, nor the "marche en fauche," as the patient could neither grasp nor walk.

Babinski's combined flexion of the thigh and trunk could not be elicited, as the patient professed inability to raise herself in the regular way. I was not then acquainted with the modification of this sign for which we have to thank Hoover[2]. This consists in the pressure exerted by the heel of the sound limb upon the floor or bed when the patient tries to lift the opposite leg or to sit up. A normal person synergically presses both heels against the floor when trying to get up from the recumbent position. In a true hemiplegic, full pressure is exerted only by the sound limb, the pressure of the paralyzed limb being diminished proportionally to the defect of the motor neurones, however hard the patient is trying to rise or to lift the opposite leg, as the case may be. A simulator or hysteric, on the other hand, cannot lift the sound leg without exerting synergic pressure with the heel of the paralyzed leg; and when he is asked to lift the paralyzed leg his feigned attempt is accompanied by synergic downward pressure of the contralateral limb; this proving that no real attempt is being made to lift the leg.

A further modification of this sign has been described by Zenner[3]. This consists in estimating the downward pressure of the thighs instead of that of the heel, as employed by Hoover. The writer has tested each of these signs, and finds them both of easy application, and does not feel the difficulty in appreciating the pressure of the heel which Zenner has experienced in employing Hoover's test.

The uninitiated might have been thrown off his guard by the certain history of hemiplegia treated as organic by so eminent a

man. I addressed myself, however, to the objective signs. I found no exaggeration of the tendon jerks of the patella, Achilles, triceps, masseter or radialis, no diminution of the homolateral abdominal reflex, no extension of the great toe on stroking of the sole. Both platysmae contracted normally on forcible depression of the chin. There was no hypotonia, and, lastly, the palsied arm and leg, when suddenly let go after being supported or gradually lifted, showed distinct contraction of antagonist muscles, and there was no synergic contralateral contraction upon forced efforts. There was no implication of facial or ocular movements and no dysarthria. A paralysis flaccid and absolute, an anesthesia complete and ceasing abruptly at the mid-line comprised the whole syndrome. These characters were sufficient to exclude organic hemiplegia in the present attack, and moreover made it highly probable that the former attack was incorrectly diagnosed ; for it is certain that a relapse of cerebral hemiplegia of vascular origin would have been certainly accompanied by distinctive objective signs, especially that of Babinski[3a], which was not the case with this patient.

Were another argument needed, the immediate success of my treatment furnished it ; for I told the patient that her hemiplegia was certainly not organic, that it was curable by the education of the movements which I showed her how to make, at first passively ; and that on my return visit I expected her to shake hands. The coöperation of the husband, a medical man, was enlisted by explaining the mechanism of the affection in due course. At my next visit, several days later, the patient shook hands with me, and walked across the room, as she had been doing for several days. The slight remaining weakness I assured her would disappear in a few days.

*Facial Palsy and Blepharospasm.*—The help derived from the character of a facial palsy was not afforded in this case. As should be well known by now, hysterics sometimes simulate facial palsy, as well as ptosis with or without orbicular spasm or contracture. In them, however, there is always synergic response of the palsied side when the well one contracts ; for it is not possible to contract the muscles of involuntary expression homolaterally without long practice. The fact that the frontalis or orbicularis are spared does not, however, negative a lesion ; for these are innervated by a separate portion of the facial nucleus (Page May[4] and Marinesco[5]) in the medulla, and have also a separate cortical

center; accordingly they may escape palsy derived either from the high or lower neurone, as well as in hysteria.

Organic ptosis must therefore be diagnosed by distinguishing the positive signs, such as the constant contraction of the corresponding *corrugator supercilii* to compensate for the loss of the *levator palpebrae;* though even this may be simulated by a forcible contraction of the orbicularis at the same time, which will give rise to a clinical picture resembling true blepharospasm with or without palsy. It is distinguished by the twittering and explosive volleying of the true spasm, while the hysterical is like a voluntary contraction, and does not so invariably begin in the orbicularis. A true palsy of the orbicularis is revealed by the sign of Cestan and Dupuy Dutemps[6], which consists of the raising of the eyelid when the patient attempts to close the eyes while looking down. The palsied eyelid will perceptibly ascend before the eye closes (Charpentier[7].)

The ptosis caused by the extreme fatiguability one finds in *myasthenia gravis* must be confused with neither this defect nor with hysteria.

It is sometimes hard to decide that atrophy of muscle is present; for on the one hand fat may mask wasted muscle, and on the other general emaciation may make one suppose that the muscles are absent when that is not the case. I need not here enlarge upon the elecro-diagnostic criteria of lower motor neurone palsy. They are infallible when used by one knowing the pitfalls of electrical resistance.

*Evanescent Perturbations of the Motor Tract.*—It cannot be too widely known that a mere interruption of the pyramidal tract by edema, anemia or perhaps even a toxin may give rise to a temporary Babinski sign, which will disappear with its cause. Therefore one should not prognose in a case where such a possibility is not excluded. It is not uncommon that dyscrasic states, such as diabetes and uremia, injure predominantly only one side of the nervous system. Even the causal factor of polyneuritis may act only unilaterally, as shown by the striking case of ascending paralysis cited by Camp[8], and found post mortem to be solely a unilateral peripheral neuritis without implication either of cord or brain.

*Paralysis Agitans.*—Nor must its unilateral commencement allow the spasticity of "paralysis agitans" to be confounded with

that of frank pyramidal disease. Here a slight weakness of the Achilles jerk sometimes occurs, as Rissien Russell[9] points out. Hysteria, however, cannot be excluded in some parkinsonian cases; for even the trembling is much influenced by the will and the spasticity becomes relaxed as the limb is used. A test I have often used is to suddenly clutch and raise the arm or leg while the patient is engrossed; flaccidity excludes paralysis agitans and renders probable a diagnosis of psychic affection. The therapeutic test may then clinch the diagnosis. As the old proverb has it, "*Naturam morborum curationes ostendunt.*" This test is, of course, not applicable to permanent hysterical contracture, but the general characters of these contractures are not likely to be confounded with the spasticity of paralysis agitans.

Any tremor in the aged accompanied by spasticity is by no means Parkinson's; for the socalled essential or hereditary trembling may not ensue until late in life. For diagnosis of these we must depend upon their character, for these essential tremors approximate to those found in toxic conditions, *i. e.*, are finer and less regular than that of paralysis agitans.

*Occupation Cramps, Tics and Spasms.*—A special kind of incapacity for movement is that found in occupation cramp. Here the muscles can quite easily perform any movement called for except the particular ones required by a specific act. It is not difficult to see from this very definition that its pathogenesis is psychic. It is, indeed, in mechanism a tic, only differing from one in being excited by a particular specific stimulus, viz: the desired automatic act; whereas a tic, in the strict sense, is excited by all and sundry stimuli, indeed, independently of any.

It is thus a great error of practice to treat scriveners' palsy by local applications, massage, electricity or strengthening exercises.

The muscle "cramp" is caused by the idea of the need to write, and is relieved at once by the replacement of that idea by another, such as the idea to perform some other act even by the same muscles; as, for instance, in the case of the girl who could not write with a pen but could do so quite well with a pencil[10]. Is it not puerile to suppose that incapacity due to a weak muscle could extend to a pen without doing so to pencil?

The whole matter of the tics cannot be entered into here save

to mention one form torticollis. This is a palsy in the sense that the head cannot be voluntarily straightened whether contracted constantly (tonic) or intermittently (clonic). The agonists of the desired act are overcome by their antagonists. Functionally speaking, the muscles are rarely groupable in terms of a particular peripheral nerve, but are always so in terms of physiologic acts. They therefore correspond to cortical, not neural, groupings. The author has recently considered the diagnosis between tic and true spasm, and has placed the differential points in the form of a table[11].

Hence the torticollis only differs from a normal act in being ill-timed, functionally useless or injurious, often excessive, imperfect or a mere sketch of some normal act. As Meige[10] puts it, "a smile with no corresponding pleased thought; a cry or word denoting no appropriate idea ; a gesture to relieve a non-existent irritation; a chewing movement while the mouth is empty."

The well-known imperative need to perform the morbid act and the satisfaction ensuing upon its completion, do not differ from the physiologic, except by its domination of the victim.

An understanding of this pathology shows how useless and, indeed, injurious is a resection of nerve and muscle in such an affection. Of course, I am not speaking of torticollis induced by that rarer condition, a neuritis or pressure upon the spinal accessory nerve, or the spasm caused by its irritation. Nor do I speak of hysterical wryneck, which is sometimes abolished by surgery, through the suggestion of cure the cutting brings. These forms are both rare, however, in comparison with true mental torticollis. The positive diagnosis, too, is generally easy; for the stigmata of psychasthenia are rarely absent, and the procedure involved in their detection is not too difficult for the average practitioner who will take the trouble to acquire it. As illustrating the errors of diagnosis caused by such cases, I quote one cited by Cruchet[12], from Boetius. The patient, an Irish woman, became ill after having rubbed her neck with a mercurial ointment procured from a charlatan. The author tells us that the woman was completely cured at the end of two weeks by using sudorific tisanes, by frequent applications of fomentations and by ointments, etc., applied to the neck; but that a short time later, having been imprudent enough to apply the same ointment to the nape of the neck, the contortions returned.

These were neglected for some time, and subsequently they augmented to such an extent that neither the remedies already applied nor any others were successful.

A recent example of the regrettable confusion derived from indiscriminate use of the word "spasm" is afforded by the two cases reported by Giriamo Mirto[13]. One was treated by alcohol injections into the 7th nerve, the other by nevrectomy of the ophthalmic. Both relapsed early, and Mirto inferred that the blepharospasm must therefore be psychic, one of these cases being a tic of professional movement, and the other also a tic, being due to a faulty habitual attitude.

The work of Meige[10] has left no excuse for such ineffectual and risky operations. As Brissaud[14] trenchantly remarks, "Instead of proceeding to operate at once and being content thereafter to enjoin on the patient, whenever the wound is healed, a course of exercises to be persevered with over long months or even years, better give the same good advice long months or even years before inflicting him with the operation."

Another instance where accurate neurological technique was sadly lacking was afforded by the cases reported by Desterac[15] to the Congress of Toulouse. The walk of one resembled the spastic gait of Friedreich's ataxia ; that of the other was incoördinate like cerebellar ataxia; in addition both had spasm of the hand in writing, spasmodic movements of the trunk, and "spasmodic torticollis" ; both had clubfoot and scoliosis, and one was afflicted with spasm of the face and left arm. In this case, further, there was nystagmus, together with loss of reflexes and difficulty in articulation, while fibrillary contractions were to be observed in his muscles. The other patient's reflexes were exaggerated, and he showed a double extensor response. Meige later saw the former case and found that the scoliosis was not permanent, the deformation of the foot could be overcome, and at the same time he failed to convince himself of the presence of nystagmus and the absence of the knee-jerks. Moreover, he happened to observe the patient in the street unawares, and remarked how between two phases of bizarre contortions his vicious attitudes and convulsive gestures almost entirely vanished. In fact the clinical picture seemed to be quite other than that associated with organic disease such as Friedreich's disease or hereditary cerebellar ataxia.

*Pseudo-bulbar Palsy.*—The disordered emotional manifestations

which accompany it might lead an inexperienced observer to believe that purely functional causes were at the root of the form of disability known as pseudo-bulbar palsy. This syndrome, however, is the result of bilateral interruptions in the cortico-bulbar projection fibers (Brissaud[16], Compte[17]). The lesions, though sometimes extensive, may be of the lacunar type, small though numerous. It is rarely that they do not produce some modification of control of the limbs in addition to the preponderant interference with the power of moving the lips, tongue, palate, pharynx and larynx, which is the source of dribbling of saliva regurgitation through the nose, the choking and characteristic dysarthria and vocal monotony of these patients. The crural dyskinesia consists mainly of the *marche aux petits pas* with its shuffling, hesitating, short steps, slightly spastic in type, the doddering gait of the aged. The reflexes are usually slightly exaggerated though clonus and Babinski's sign are rarely present. As a rule, the patient can make quite extensive though uncertain movements of his legs when urged to do so; it is only in the walk or other automatic act that the movements are so restricted. When the lesions occur below the red nucleus, they may cause mesencephalic tremor, which will be more evident in the arm by an uncertainty of movement, somewhat resembling that of multiple sclerosis. These cases are less common than those originating in the *centrum ovale*, and tend to lack the manifestation of emotional expression rather than to show the inapposite outbreaks characteristic of the former lesions. The probable explanation of this difference is that, as Pagano[18] believes, the reactions of emotivity are determined by the *corpus striatum* or other basal ganglia, and pass through the rubro-spinal and perhaps vestibulo-spinal tracts. A mesencephalic lesion therefore prevents the passage of ganglionic impulses; whereas a lesion in the *centrum ovale* merely cuts off their cortical inhibition, and hence prevents the regulation of their activities by the higher centers, and permits of the spasmodic laugh and cry so characteristic of the upper type of pseudo-bulbar palsy.

Some clinicians, notably Brissaud[19], have believed that a unilateral lesion could produce this syndrome, but their conclusions depend upon incomplete *post mortem* examination, for Compte[20] has shown that a complete series of brain sections always reveals bilateral lesions. It is possible, however, that a mere apraxia

affecting the face, mouth, tongue, palate, etc., may have simulated a true palsy; and in that case, the lesion need have been only unilateral, though some of the cases adduced have shown right-sided lesions, whereas apraxia is the result of lesions of the left hemisphere, except in the left-handed.

Others have maintained that lesions of the *putamen* were the true cause, and that these organs were really subsidiary centers for associating the special acts of articulation and swallowing, and that their destruction must entail pseudo-bulbar palsy. This contention seems to be disproved by two cases which Déjèrine[21] observed in which there was found destruction of the outer portion of both lenticular nuclei, in each case without any pseudo-bulbar symptoms during life.*

*Apraxia and Aphasia.*—Not to be confounded with paralysis is the disability of action known as apraxia, of which the most familiar variety is aphemia, more commonly called motor or Broca's aphasia. Though not paralyzed, a completely apraxic limb is to all intents and purposes helpless; for it cannot be directed by the patient toward the act desired; though it may spontaneously or otherwise perform any particular movement; for instance, when asked to place the right hand on the head the patient may merely extend the arm; when asked to put out the tongue he may respond by merely working his jaw, and so on.

When his disability commences, the patient is much astonished by this type of incapacity, and may appear dazed, just as is a man suddenly stricken deaf. This apparent confusion may be mistaken for dementia. It is, however, merely secondary to the unaccustomedness of not being able to perform actions which have been so well within the patient's powers as to be nearly automatic; whereas, in the insane the confusion is the cause and not the effect of whatever incapacity they manifest.

Apraxia is due to lesions of the fibers associating the perceptual and conceptual kinesthetic centers with the psycho-motor area. Eupraxia is mainly a function of the left cerebrum, and hence requires for its exercise the integrity of the *corpus callosum*, at least where the left side of the body is concerned. Liepmann[22] at first believed its seat to be in the upper parietal convolutions, but recently strong reasons have arisen to show that the con-

* Through the courtesy of the *Medical Record*, New York, to the editor of which I am indebted for permission to reproduce this editorial.

ceptual kinesthetic centers, at least, are situated in the frontal lobe, probably in the second left convolution, not far from the gyrus which plays the largest part in controlling speech. It is possible that the form of paraphasia, commonly called "jargon aphasia, may sometimes arise from a lesion of the left second frontal, and be merely a form of dyspraxia. It is, however, usually considered to be the result of a lesion of the angular gyrus (Déjèrine[23]), Wernicke's zone', thereby being included among the sensory cerebral abnormalities and constituting a variety of agnosia.

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23. "Semeiologie de la Système Nerveuse." Traîtè de Pathologie Interne de Bouchard, Brissaud, 1901.

**Dr. Bishop** had little to say beyond congratulating the essayist. He wished, however, to take issue with the statement that all tics are purely physical; there are certainly cases of writers' cramp, for instance, which may be cured by electricity, and therefore must have a physical basis. This statement might be substantiated by a number of members of this Society—one in particular, a former secretary, had had writers' cramp himself and had been cured by electrical treatments.

**Dr. Williams** called Dr. Bishop's attention to his statement in the paper that there are two types of tics. Owing to the limited time, Dr. Williams had been unable to speak in detail of the psychasthenic tics, and but little in reference to the hysteric type. It is important to remember the distinction between tic and spasm; it is very well defined that tics are purely psychasthenic, while spasm, on the other hand, is dependent upon some organic irritation in the reflex arc. The irritation may be applied, in the case of spasm, anywhere in the circuit between sensory end organ, by way of sensory path, sensory central receiving apparatus, central motor apparatus, motor projection path, to motor end organ in muscle. Tics are habitual disordered movements, imperfect, sketchy imitation of physiologic movements, in which they actually have their origin. Tic movements begin as the result of sensation; patients resent interruption of the movements, but inhibition is possible, as during observation. Spasm cannot be controlled; also, there are certain physical characteristics of spasmodic movements, as, for instance, their resemblance to the contractions in response to electrical stimulation and their distribution in a peripheral nerve area. *Tic* is incorrectly applied to *tic douloureux* and is apt to be misleading.

With regard to writers' cramp, it is true that the affection may be curable by the use of electricity. But it must be remembered that there are three kinds of scriveners' palsy; that variety due to defect of muscles or motor neurons cannot be affected by psychic means; electricity may be applicable in this variety. Second, writers' cramp may be due to a fixed idea; the hysteric type. This form may be curable by electricity as a powerful suggestive agent. The third and commonest form is the psychasthenic writers' cramp; it occurs in individuals of the psychasthenic make up, those subject to phobias of various kinds, such as fear and anxiety as to their ability to continue to perform their particular avocations.

All these considerations show the extreme importance of making an accurate diagnosis in palsies of whatever kind before undertaking any treatment contemplating operations, applications of electricity, massage or other manipulations, or psychotherapy.

## ADIPOCERE, NINETY-SIX YEARS AFTER DEATH.*

By D. S. LAMB, A. M., M. D.,

Washington, D. C.

About six months ago I was asked to examine a body that was exhumed after having been buried for ninety-six years. It had been buried in a leaden coffin, which, however, from some cause, supposed to be unequal pressure, had opened at a seam and permitted water to enter, so that when exhumed the coffin was full of water. I found that while the bones of the rest of the body were loosely scattered through the coffin, the entire thorax and abdomen were as a mass intact and the soft parts converted into adipocere. So exactly had the change taken place that over the sternum, the outlines of which are plainly seen in the specimen, the skin shows what appears to be goose flesh, or possibly a pimply eruption, more likely the former. One lung was incised and showed a cavity which may have been tubercular. The remains were removed to a distant city for reburial.

In view of the long time that the body had been buried, some appearances noted at the examination were interesting, and one, at least, seems to be important. The shafts of many of the long bones were well preserved, except that they were somewhat softened ; the cancellous ends, however, and most of the small cancellous bones were absent ; some vertebrae were intact, others absent ; the patellae were present.

In the coffin were found some wood shavings, which it was said had been used for a pillow ; some pieces of what seemed to be ribbon; part of a linen shirt or shroud in two thicknesses was adherent to the front of the thorax and was so well preserved that it required some effort to tear it. The stockings were intact.

A most interesting condition was found in the skull ; there

*Reported, with specimen, to the Medical Society, October 28, 1908.

was a soft, rather friable, putty-like mass that had somewhat the shape of the brain, especially the cerebellum. This was examined by Dr. J. S. Neate, of the Army Medical Museum, who made the following statement: "The material was hardened in Mueller's fluid and formalin, dehydrated in alcohol; from thence transferred to chloroform and infiltrated with paraffin. Sections were stained with difficulty; a prolonged staining with hematoxylin yielded the best result.

"Under the microscope the major portion of the material is seen to consist of a feltwork of sustentacular tissue resembling neuroglia; in this framework are to be found groups of large cells in more or less orderly arrangement and in some cases exhibiting nuclei and vacuoles. These large cells are ovoid, pear shaped and in a few instances a multipolar arrangement can be discerned, resembling in type that of large nerve or ganglion cells.

"As to the identification of the organ, the character of the sustentacular tissue, together with the presence therein of large cells arranged in groups, some of which are multipolar, is, I think, strong presumptive evidence that the material examined represents vestiges of some part of the central nervous system."

The case therefore appears to have a medico-legal value.

**Dr. E. L. Morgan** said that adipocere was more common in this District than was generally supposed. When a street was being cut through Prospect Hill cemetery many so.called "petrified" bodies were exhumed, and the sexton stated that he had seen other cases of adipocere in that locality. The superintendent of Congressional cemetery had also stated that he had seen a number of "petrified" bodies exhumed there; the gravediggers spoke of the *weight* of the bodies; these bodies were usually in metal coffins, but sometimes in wooden ones, and in one case the coffin had decayed. Dr. Morgan was present when the coffin mentioned by Dr. Lamb was exhumed, and noticed that it was full of water. Dr. Morgan also noticed the cavity in the lung and believed that the man died of disease of the lung. Tradition says that beside the old St. Patrick's church the remains of a well-known priest were disinterred and were found to be "petrified." It is said that over 55,000 persons have been buried in the Congressional cemetery. Dr. Morgan had no doubt that many more cases of adipocere would be found in the cemeteries of this District, if looked for.

# In Memoriam.*

## CHARLES FRANKLIN RAND, M. D.

Charles Franklin Rand was born in Batavia, New York, January 19, 1839. His early education was received in the schools and academies of that section. Before he attained his majority he adopted newspaper work as his avocation, and commenced duty in that occupation in the city of New Orleans. When the tocsin of the Civil War sounded, early in 1861, he returned to his native place and was the first man to enlist on the first call for troops, for which he has been signally honored, not alone by his State, but by his country.

His wounds, received in the memorable engagement at Gaines Mills, having disabled him for active military service, a position was tendered him, which he accepted, in Washington City, where he commenced the study of medicine in Georgetown Medical College, from which institution he graduated in 1873. April 5, 1876, he was elected to membership in the Medical Society. He practiced his profession in this city from the time of his graduation until 1878, when he returned to his home on account of impaired health from recurring hemorrhages of the lung caused by the old wound received in battle.

In Batavia, after his recovery, he established a sanitarium, which he successfully conducted until his return to Washington in 1889. He resided here continuously since, and, although retired from active practice, he maintained his early interest in the Medical Society, and on the day of his death, October 13, 1908, signed his name to a check which canceled all his indebtedness to the Society.

His body rests in the beautiful City of the Dead at Arlington, under a memorial stone erected by a grateful State.

Your committee submit the following resolutions:

WHEREAS, We have learned with unfeigned regret of the painful death of Doctor Charles Franklin Rand, for many years a fellow member of the Medical Society of the District of Columbia, therefore, be it

*Resolved:* That while recognizing his continuous membership

*Resolutions adopted by the Society October 28, 1908.

of more than thirty-two years, we place on record, with pardonable pride, the distinguished service he rendered his country in the hour of need.

*Resolved:* That these resolutions be transcribed on the minutes of the Society, and a copy under the seal of the Society be transmitted to the bereaved widow, who alone of his immediate family survives.

C. W. Franzoni,
J. Thomas Kelley, Jr.,
Henry A. Robbins,
*Committee.*

## PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

**Wednesday, October 7, 1908.**—The President, Dr. H. D. Fry, presided; about 65 members present.

The following were elected active members:
John R. Buck, George Washington University, 1904.
Julian M. Cabell, University of Virginia, 1885.
Moses Hubbard Darnall, George Washington University, 1907.
Edward H. Egbert, Baltimore Medical College, 1905.
Carl Henning, George Washington University, 1905.
Howard Hume, University of Virginia, 1905.
Joseph J. Kinyoun, Bellevue Medical College, 1882.
Mead Moore, George Washington University, 1906.
Mary O'Malley, Niagara University, 1897.

For the Committee on Editing the Transactions, Dr. D. S. Lamb reported that during the vacation Dr. C. S. White had been appointed to the Committee, vice Dr. Motter, resigned.

For the Committee on History of the Society, Dr. Lamb reported that the manuscript was about ready to go to the printer; that although authority had been given the Committee to proceed with the work, it had not felt at liberty to proceed too far. The time had come when authority must be given to produce the work, and the Committee desired specific instructions from the Society. The cost thus far had been $712.65; careful estimates indicated that to publish five hundred copies would cost from $938 to $1,023; to publish one thousand copies would cost $1,263 to $1,436.

Action was deferred two weeks, and it was ordered that due notice be given.

The resignation of Dr. Clifton Mayfield was accepted.

Dr. Bishop read the paper for the evening. Subject: "Applied Electro-physiology in Electro-therapeutics." Discussed by Drs. Roy and Williams. See p. 345.

**Wednesday, October 14.**—The President, Dr. H. D. Fry, presided; about 70 members present.

The resignation of Dr. H. C. Coburn, Jr., from active membership was accepted.

The Chair announced the death of Dr. Chas. F. Rand, and appointed Drs. Franzoni, H. A. Robbins and J. Thos. Kelley a committee to report suitable resolutions of respect.

Dr. Hasbrouck reported a case of *multilocular cyst of the ovary*, and presented the specimen. Dr. Hasbrouck said that he presented the specimen because of two interesting features: first, the rapid growth of the large mass, its development apparently having occurred in but four or five weeks; and, second, its size, it being unusual to see a tumor so large at the present time.

The patient was a white woman, 32 years old; she had had some vague pelvic trouble for several years, but there had been no enlargement of the abdomen until four or five months ago.

*In situ* it extended from the floor of the pelvis to the ensiform cartilage; and when removed it weighed, with the contained fluid, from 15 to 17 pounds.

Dr. P. C. Hunt read the paper for the evening: "The Medical Witness in Lunacy Cases." Discussed by Drs. Woodward, T. C. Smith, Hickling, Williams and W. L. Robins. See p. 354.

**Wednesday, October 21.**—The President, Dr. Fry presided; about 50 members present.

Dr. A. F. A. King moved that an assessment of $3.00 per member be levied to defray the expenses of publishing the "History of the Society." Dr. Chappell moved to amend by adding the provision that each member be entitled to one copy of the "History." The amendment was accepted and the motion as amended was carried.

A letter from Dr. P. S. Roy, calling attention to the defective telephone service, was read. The Committee having the matter in charge was instructed to do what might be necessary to improve the service.

Dr. Hasbrouck presented a specimen of *myoma of the uterus*, showing unusually well defined and typical tumor masses. The history was uneventful.

Dr. Reyburn read the paper for the evening. Subject: "Chronic Neuralgia, its Cause and Cure." Discussed by Drs. P. C. Hunt, Syme, Roy, Magruder and Reyburn. See p. 363.

**Wednesday, October 28.**—The President, Dr. Fry, presided; about 50 members present.

Dr. C. W. Franzoni, for the Committee on the death of Dr. Charles Franklin Rand, reported resolutions which were adopted. See p. 386.

A letter from the Commercial Dairy Machinery Co., was referred to the Milk Commission.

Dr. D. S. Lamb presented the following specimens: 1. Adipocere; 2. Epithelioma of the uterus. The first specimen was discussed by Dr. E. L. Morgan, the second by Dr. G. Brown Miller. See pp. 384 and 370.

The paper for the evening was read by Dr. Tom A. Williams. Subject: "Differentiation of Functional and Organic Motor Palsies." Discussed by Dr. Bishop. See p. 345.


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EDITORIAL COMMITTEE.

D. S. LAMB, A. M., M. D., *Chairman*, . 2114 Eighteenth Street, N. W.
CHAS. S. WHITE, M. D., . . . . . The Farragut.


## Editorial.

REGISTRATION OF PHYSICIANS IN THE DISTRICT OF COLUMBIA.—The following bill was introduced into the U. S. Senate May 5, 1908, by Senator Gallinger, and referred to the Committee on the District of Columbia (S. 6,976):

"A BILL to amend sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That sections three, eight and thirteen of the Act approved June third, eighteen hundred and ninety-six, entitled 'An Act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof in the District of Columbia, be, and the same are hereby, amended so as to read as follows:

"SEC. 3. That from and after the passage of this Act all persons desiring to practice medicine and surgery in any of their

branches, or to treat human ailments in the District of Columbia, shall apply to said board of medical supervisors for a license to do so. Applicants shall submit to examination upon the following-named branches, to wit : Anatomy, physiology, chemistry, pathology, materia medica and therapeutics, hygiene, histology, practice of medicine, surgery, obstetrics and gynecology, diseases of the eye and the ear, medical jurisprudence, and such other branches as said board shall deem advisable. Each applicant shall be certified by said board for examination as speedily as possible to the board of medical examiners whose members are adherents to the system of medicine which said applicant desires to practice ; but said board shall not certify for examination any applicant until satisfactory proof is furnished that he or she is of good moral character and over twenty-one years of age nor until he or she has presented at least a certificate or diploma issued after four years of study either in a normal, manual training or high school of the first grade or in a legally constituted academy, seminary, or institute of equal grade, or a student's certificate of examination for admission to the freshman class of a reputable literary college, or has received an academic education, considered and accepted by the superintendent of public instruction of the District as fully equivalent, and has either received a diploma conferring the degree of doctor of medicine from some legally incorporated medical college (which in the opinion of said board was in good standing at the time of issuing said diploma) in the United States, or a diploma or license conferring the full right to practice all the branches of medicine and surgery in some foreign country, and has also studied medicine not less than four full school years of at least nine months each, including four satisfactory courses of lectures of at least seven months each in four different calendar years in some legally incorporated American or foreign medical college or colleges prior to the granting of said diploma or foreign license : *Provided*, That said diploma, if issued prior to July first, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that said applicant has studied medicine and surgery for not less than three years prior to the issue thereof, and if issued subsequent to June thirtieth, eighteen hundred and ninety-eight, shall be accompanied by satisfactory evidence that the applicant has studied medicine and surgery for not less than four years prior to the issue of said diploma. All examinations shall be both theoretical and practical and of sufficient severity to test a candidate's fitness to practice medicine and surgery.'

" 'SEC. 8. That if in the opinion of a majority of the board of medical supervisors, after a careful examination of the report of the board of medical examiners by which any applicant was examined, said applicant has fairly and successfully passed such examination as hereinbefore provided for, the board of medical

supervisors of the District of Columbia shall, as soon thereafter as possible issue to him a license signed by the president and the secretary of said board and attested by the seal of the District of Columbia, which license shall entitle said applicant, after it is registered as hereinafter provided, to practice medicine and surgery in the District of Columbia: *Provided*, That a license shall be issued upon application, free of cost and without examination, to each physician who is registered at the health office of the District of Columbia at the time of the passage of this Act, and to physicians who may change their residence to the District of Columbia from any State or Territory where medical laws and medical examining boards exist, the presentation of a certificate or license from a medical examining board, if found upon due inquiry to be true and genuine, being sufficient evidence of right to registration and certification under the provisions of this Act. *Provided*, That the medical laws and examining boards of such States and Territories, whose requirements are equal to those of the District of Columbia, grant equal rights and recognition to the licentiates of the board herein created. All licenses issued by said board shall be numbered consecutively, and a register shall be kept by the secretary showing the number of each license, the date of issue, and to whom issued.'

"'SEC. 13. That from and after the passage of this Act any person practicing medicine and surgery, midwifery, or treating human ailments in the District of Columbia, or who shall publicly profess to do so, without first having obtained from the Board of medical supervisors of the District of Columbia a license and registered the same as herein provided, or in violation of any of the provisions of this Act or any of the rules and regulations made by authority conferred herein, or after his license or registration has been canceled by order of said board of medical supervisors of the District of Columbia, shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished for each offense by a fine of not less than fifty nor more than five hundred dollars, or by imprisonment in the District jail for a period of not less than ten nor more than ninety days, or by both such fine and imprisonment. It shall be the duty of the United States district attorney for the District of Columbia to prosecute all violations of the provisions of this Act.'"

It would seem that a law such as that of New York or Texas, which provides for a *single* examining board and omits from the examination the subjects of materia medica, therapeutics and practice of medicine, and requires only that the candidate shall have a sufficient knowledge of anatomy, physiology, chemistry, bacteriology, pathology, surgery, gynecology, &c., would be

better, permitting the physician to practice on any theory he chooses, which, indeed, *he will do anyhow*.

We think that this bill needs careful consideration. A number of questions arise; for instance, in section 3 is a requirement that the medical school from which the candidate has graduated must have a course of "four full school years of at least *nine* months each." The italics are ours. How many, or rather, how few medical schools in the United States have a "full school year of nine months?" *Where would the Washington medical schools come in?*

The provision in section 3, that diplomas issued prior to July 1, 1898, shall be accompanied by satisfactory evidence that the applicant has studied medicine and surgery for not less than three years prior to the issue thereof, probably means that he shall have attended three years at a medical college. Now it should be remembered that the three years requirement in most schools in the United States did not become obligatory before about 1879; in other words, graduates before that time would most likely be barred from the examination provided for in the bill.

The above are probably the most important considerations; there may be others.

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The following bill (House Bill No. 21,982) was introduced into the House of Representatives, May 12, 1908, and referred to the Committee on Interstate and Foreign Commerce. It is claimed by some that the first section of the bill would prevent physicians dealing directly with pharmaceutical houses outside the District of Columbia; that a physician who dispenses more or less of the products of such houses would be compelled to buy from jobbers and retail druggists in the District, and then only on a *prescription;* that if he should want to give a hypodermic injection of morphine at midnight to some suffering patient he would have to write a prescription for the same and wait till the druggist filled it. It is thought best, therefore, to print the bill in full for the information of the members of the Medical Society.

"A Bill relating to the transportation of habit-forming and poisonous drugs in interstate and foreign commerce, and for other purposes.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That it shall be

unlawful for any person, firm, or corporation to send, carry, ship or bring into any State, Territory, or the District of Columbia, by freight, express, mail, or otherwise, from any other State, Territory, or the District of Columbia, or from any foreign country, directly to a consumer, or to sell, or furnish, or give away, or have in his or her possession, except as provided for in this section, in the Territories or the District of Columbia, any alpha or beta eucaine, chloral hydrate, cocaine, hyoscine, morphine, opium, scopolamine, or any derivative or preparation of any of the foregoing substances, except upon the original prescription or written order of a legally authorized practitioner of medicine, dentistry or veterinary medicine, which prescription or order shall be dated and shall contain the name of the person for whom prescribed, or if ordered by a practitioner of veterinary medicine shall state the kind of animal for which ordered and shall be signed by the person giving the prescription or order. Such written prescription or order shall be kept on file for a period of not less than three years by the person, firm, or corporation who shall compound the article or articles prescribed or ordered, and it shall not again be compounded or dispensed except upon the written order of the original prescriber for each and every subsequent compounding and dispensing. In no case, however, shall the original prescription or written order, for a human being, call for more than one-fourth of one ounce of chloral hydrate or more than one-eighth of one ounce of alpha or beta eucaine, cocaine, hyoscine, morphine, opium, scopolamine, or corresponding amounts of any derivative of the above-named substances, whether simple, mixed, or compounded into any preparation; and when two or more of any of the above ingredients are prescribed together the combined total quantity of such substances prescribed must not exceed one-eighth of one ounce. The above original prescriptions and written orders shall be subject to inspection at all times by any Federal or State official delegated by the Secretary of Agriculture: *Provided, however*, That the above provisions shall not apply to sales at wholesale by jobbers, wholesalers, and manufacturers to registered retail druggists or to each other, or to sales made to manufacturers of medicinal remedies or pharmaceutical preparations for use in the manufacture of such preparations, nor to sales to hospitals, colleges, scientific and public institutions.

"SEC. 2. That no person, firm, or corporation shall send, carry, ship, import, or bring into any State, Territory, or the District of Columbia, by freight, express, mail, or otherwise, from any other State, Territory, or the District of Columbia, or receive for shipment into any State, Territory, or the District of Columbia, or sell or furnish or give away in the Territories or the District of Columbia any of the following-described substances, to wit: The caustic hydroxides of ammonium, potassium, and sodium; the concentrated mineral acids; the essential oils of bitter

almonds, pennyroyal, rue, and savin; wood alcohol and yellow phosphorus or any preparation or compound containing the same; the salts and derivatives of antimony, arsenic, barium, chromium, copper, gold, lead, mercury (excepting calomel), silver, and zinc, or any preparation or compound containing the same; the following-named substances and their derivatives or any compound or preparation containing the same, namely, acetanilide, acetphenetidine, aconite, antipyrine, belladonna, cannabis indica, cantharides, carbolic acid, chloral hydrate, chloroform, cocculus indicus, codeine, colchicum, conium, cotton root, creosote, croton oil, damiana, diacetyl morphine, digitalis, ergot, formaldehyde, hydrocyanic acid, hyoscine, hyoscyamus, ignatia, laudanum, lobelia, morphine, nux vomica, opium, oxalic acid, paregoric, Paris green, phenacetine, physostigma, phytolacca, pyramadon, scopola, stramonium, strophanthus, strychnine, sulphonal, tansy, trional, veronal, veratrum viride, or any other virulent poison, unless the bottle, box, carton, or any other package, including any wrapper or covering, containing any of the above-named substances, compounds, preparations, or derivatives is labeled and such label is printed upon red paper in distinct white letters or in distinct red letters upon white paper, with the word "Poison" in letters not less in size than any other letters used on the label, and in no case smaller than required by regulation seventeen (c) of the rules and regulations for the enforcement of the food and drugs Act of June thirtieth, nineteen hundred and six, and the skull and cross-bones device, together with the names of one or more suitable antidotes and the name and address of the person, firm, or corporation manufacturing, shipping, importing, or selling the same.

"SEC. 3. That any person, firm, or corporation violating any of the provisions of this Act shall be guilty of a misdemeanor, and for such offense shall be fined not exceeding two hundred dollars for the first offense and, upon conviction, for each subsequent offense not exceeding three hundred dollars, or be imprisoned not exceeding one year, or both such fine and imprisonment, in the discretion of the court."

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BUREAU OF PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.—A board of commissioned medical officers will meet at the Bureau, 3 B Street, S. E., Washington, D. C., Monday, January 11, 1909, at 10 o'clock A. M., for the purpose of examining candidates for admission to the grade of assistant surgeon in the Public Health and Marine-Hospital Service. For further information, or for invitation to appear before the board of examiners, address "Surgeon-General, Public Health and Marine-Hospital Service, Washington, D. C."

PHOTOGRAPHS OF MEMBERS.—The subjoined list of names is a partial list of those members, past and present, whose photographs have not thus far been received by the Committee on "History." The list is only partial; it does not include a small number who have declined to furnish their photographs; nor does it include those members of whom but little is known and apparently there is no possibility of their photographs ever being received; nor does it include the names of those who were elected at the meeting October 7th. The latter are accordingly requested to take notice of the fact that the Society has authorized the Committee to proceed with the publication of the "History" and it is necessary, therefore, that any member desiring to have his picture appear therein should send his photograph to the Chairman of the Committee, Dr. D. S. Lamb, 2114 18th Street, N. W., as soon as practicable.

It is thought that possibly some member might be able to secure for the Committee one or more photographs of those who have died or left the City; it is hoped, therefore, that members will carefully examine the list with a view to assist in this matter.

Allen, C. L.
Allen, C. W.
Baggett, J. B.
Baily, D. G. P.
Baldwin, W. O.
Barnes, J. D.
Barnhart, G. S.
Beall, B. M.
Beall, C. M.
Beatty, H. M.
Beatty, L. K.
Bigelow, H. R.
Bird, J. C.
Blackburn, R. S.
Blair, David
Blanchard, S. B.
Blake, J. H.
Boswell, E. V.
Brayshaw, J. L.
Briggs, J. B.
Bromwell, J. R.
Brown, A. R.
Brown, G. A.
Browne, R. T.
Bruckheimer, M.
Buchanan, C. M.
Butt, W. B.
Caldwell, C. T.
Caldwell, W. A.
Carmichael, C. H.
Carrico, A. J.
Carroll, J. J.
Carroll, J. M.
Carvallo, Carlos
Caselli, E.
Causin, N. P.
Causten, J. H.
Chapman, J. S.
Chew, T. J.
Christie, Arthur
Christie, F. C.
Clark, Taliaffero
Clarke, Geo.
Coburn, H. C.
Coe, Anton
Coggeshall, G. A.
Cole, G. R. L.
Cole, J. T.
Combs, J. G.
Condict, H. F.
Coolidge, R. H.
Cragin, W. A.
Crawford, C. A.
Crittenden, T. B.
Croghan, Patrick
Crosson, H. J.
Culver, F. B.
Curriden, G. A.
Cutbush, E.
Cuthbert, M. F.

Dailey, O. A.
Davis, A. M.
Davis, C. L.
Davis, J. W.
Davis, P. C.
Devereux, J. R.
Dexter, J. E.
Dixon, H. M.
Dixon, T. B.
Dovilliers, L.
Dowling, Thos.
Drawbaugh, J. A.
Durfee, K. B.
Duvall, A. M.
Dyer, J. I.
Edelin, J. B.
Ellyson, R. M.
Elzey, Arnold
Emmons, C. M.
Everett, S. W.
Eversfield, W. O.
Fairfax, O.
Fernald, F. C.
Filler, C. W.
Fitch, G. A.
Force, C. F.
Forry, Samuel
Forsythe, A. D.
Foster, G. W.
Fowler, E. W.
France, J. M. D.
Fremont-Smith, Fr'k
French, L. H.
French, R.
French, W. B.
Friedrich, L. L.
Fry, Samuel
Frye, T. B. J.
Fuller, H. G.
Gallagher, M. F.
Gannon, J. A.
Gassaway, J. M.
Gill, W. T.
Gladmon, E.
Glazebrook, L. W.
Goodall, H. S.
Gould, P.
Graham, N. D.
Graham, R. H.
Gray, Henry
Greene, S. H.
Grinder, G. W.
Grymes, J. M.
Gunnell, J. S.
Gustine, J. T.
Gwynn, W. C.
Hamilton, C. D.
Handy, W. E.
Hannon, S. L.
Harris, J. O.
Harris, R.
Hawkes, W. H.
Hayes, H. L.
Healey, T. M.
Hellen, B.
Henderson, Thos.
Hill, F. H.
Holmead, Anthony
Hooe, A. B.
Hopkins, G. M.
Horsley, Samuel
Hough, W. H.
Howard, H. P.
Howland, G. T.
Hull, T. Y.
Hummer, H. R.
Huntt, Henry
Jaisohn, P.
Johnson, L. B. T.
Johnson, Richmond
Johnson, Wallace
Jones, G. I.
Kaufmann, H. M.
Kaveney, J. J.
Keene, W. P.
Kerr, H. H.
Kidder, J. H.
King, G. S.
King, J. F.
Knight, C. P.
Kurtz, John
Latimer, E. W.
Lauck, J. S.
Lawson, H. W.
Lawver, W. P.
Leach, H. E.
Leech, D. O.
Lehr, L. C.
Liddell, H.
Lieber, Franz
Lindsly, Webster
Little, R. M.
Littlewood, J. P.
Logie, B. R.
Lorigan, Kathryn
Lowe, T. P.
Luce, C. R.
McAdory, R.
McCleary, J.
McCoy, G. W.
McGuire, J. C.
McKay, J. C.
McKim, J. D.
McMahon, J. P. C.
Maddren, E. S.
Mason, R. F.
Masterson, W. F.
Maxcy, F. E.
May, Wm.
Mead, Theodore

Medford,
Melvin, W. B.
Middleton, Rozier
Miller, A. W.
Minor, C. L.
Moore, S. E.
Moran, J. F.
Moulden, W. R.
Muncey, E. B.
Murphy, J. A.
Nash, F. S.
Naylor, W. L.
Newton, L. E.
Norris, J. C.
Norton, A. L.
Norton, T. M.
Ober, G. C.
O'Donoghue, F.
O'Donoghue, J. A.
O'Malley, A.
Offutt, G. W.
Osmun, C. J.
Page, R. A.
Page, W. M.
Pancoast, G. L.
Parker, E. M.
Parsons, A. V.
Parsons, John
Perry, Benjamin
Phillips, W. F. R.
Pile, M. M.
Porter, H. T.
Portman, A. E.
Purrington, Thos.
Rahter, C. A.
Raines, B. R.
Ramsay, W. T.
Randolph, B. M.
Reede, E. H.
Reville, L. M.
Reynolds, R. M.
Rhett, Benjamin
Rich, F. R.
Richards, F. P.
Richards, John
Richardson, E. E.
Roane, James
Rogers, J. D.
Rosse, I. C.
Russell, H. C.
Schneider, E.
Scott, T. C.
Sellhausen, E. A.
Semmes, A. J.
Sim, Thos.
Simms, H. C.
Smith, J. E.
Smith, L. P.
Snowden, A.
Speake, R. H.
Stewart, J. D.
Storch, B. A.
Storrow, S. A.
Story, L. E.
Stout, A. M.
Stuart, A. R.
Stuart, James
Suter, Norwood
Sutherin, J. W.
Syme, W. H.
Talbott, J. A.
Tappan, J. C.
Taylor, L. H.
Taylor, L. M.
Thomas, J. M.
Tiefenthaler, B. F.
Tobias, H. W.
Trautman, Chas.
Trist, H. B.
Tucker, M.
Tucker, W. M.
Turner, S. S.
De Vries, J. C.
Walker, A.
Walsh, F. C.
Walsh, J.
Walsh, J. K.
Walter, Wm. F.
Ward, Wm.
Ward, W. K.
Warfield, Peregrine
Waring, J. J.
Washington, B.
Waters, W. H.
Watkins, Victor
Weaver, C. A.
Weightman, R.
Wells, W. S.
Whiteley, W. H.
Wilkinson, W. W.
Williams, Bodisco
Williamson, A. M.
Willson, Prentiss
Wilson, J. M.
Wilstach, C. F.
Witmer, A. H.
Wotherspoon, A. H.
Wright, H. K.

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The XVIth International Medical Congress.—Secretary-General, Professor Emil Grósz, M. D.—Office, Budapest, VIII, Esterházy-uteza 7.—In accordance with the resolution

passed at Lisbon on the 26th April, 1906, the XVIth International Medical Congress will be held at Budapest from the 29th August till the 4th September, 1909, inclusive.

"His Imperial and Apostolic Royal Majesty Francis Joseph I, has deigned to accord his august patronage to this scientific gathering. The Royal Hungarian Government and the Municipality of the Capital and Residence City of Budapest have also promised to afford us their great and benevolent support.

"In the name of the Executive Committee of the Congress, we invite you, Sir and most honored Colleague, to take an active part in the work of this scientific gathering. The rules, which you will find annexed, will give you all the necessary preliminary information, and the programme enclosed will show you that we are in a fair way to be able to bring before the Congress many important questions of Medical Science which form the subject of much discussion at the present day.

"The eminent specialists whose names figure on our programme,—besides Hungarian savants—leading lights of the Medical profession in all countries have promised us their valuable co-operation. We hope, Sir and most honored Colleague, that you also will identify yourself with our scientific work, and contribute thereto the results of your own labors and experience.

"As far as we are concerned, with the concurrence of our colleagues in Hungary, we shall spare no effort in order that the XVIth International Medical Congress may in every respect be worthy of its predecessors, and we shall do our best that all our guests may hereafter cherish pleasant memories of their visit to Budapest."

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The Following Letter has been received from the Pasteur Vaccine Company, Ltd.:

"New York, *June 6, 1908.*

"Washington Medical Annals, Washington, D. C.

"Gentlemen: In connection with the widespread and increasing interest throughout the civilized world in the matter of the prevention and cure of tuberculosis you will be interested to learn that Prof. Marmorek, the discoverer of antistreptococcic serum, at the Institut Pasteur, Paris, has signified his willingness, at the request of our Paris house, to supply physicians who are especially known through their work in connection with tuberculosis with a certain amount of his tuberculosis serum for clinical tests gratis. Such physicians, if they will communicate with us, we will immediately place in touch with Prof. Marmorek through our Paris house.

"We should be pleased to supply, for clinical experiments in

your wards for contagious diseases, a sufficient amount of a new scarlet fever serum for internal administration gratis.

"Yours very truly, PASTEUR VACCINE CO., LTD."

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## EXCHANGES.

*Annals Gynecology and Pediatrics.*
*Buffalo Medical Journal.*
*Colorado Medicine.*
*Cronica Medica Mexicana.*
*Desinfektion*, Berlin.
*Folia Therapeutica*, London.
*Illinois Medical Bulletin.*
*Journal Indiana State Medical Association.*
*Journal Kansas Medical Society.*
*Journal Medical Society New Jersey.*
*Journal Michigan Medical Society.*
*Louisville Monthly Journal Medicine and Surgery.*
*Maryland Medical Journal.*
*Modern Medicine.*
*New York State Journal Medicine.*
*Northwest Medicine.*
*Old Dominion Journal.*
*Pacific Medical Journal.*
*Proctologist.*
*Providence Medical Journal.*
*Quarterly Bulletin Northwestern University Medical School.*
*Texas State Journal Medicine.*
*University of Minnesota Bulletin.*
*Virginia Medical Semimonthly.*
*West Virginia Medical Journal.*

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## PUBLICATIONS RECEIVED.

J. B. Murphy, "Perforative peritonitis"; reprint.

A. C. Geyser, "X-ray in dermatology. Using the x-ray without burning. Diagnosis and treatment of rheumatism and allied affections"; three reprints.

F. F. Russell, "The comparative morphology of the spirochaetes of syphilis and yaws (Framboesia tropica)"; reprint.

W. K. Sutherlin, "Case of diphtheria in which 498,000 units of antitoxin were given"; reprint.

A. E. Gallaudet, "Movable kidney in the genesis of bile-duct diseases. The long-waisted woman and her movable kidney"; two reprints.

H. A. Robbins, "Syphilis of the organs of sight and hearing, taste and smell, and the teeth and accessory organs of digestion. Chancroid and bubo"; two reprints.

C. H. Lavender, "Pellagra"; published by U. S. P. H. and Marine Hosp. Serv.

J. D. Morgan and W. W. Wilkinson, "Report of ten cases of epidemic cerebro-spinal meningitis treated with the antimeningitis serum"; reprint.

Otto Juettner, "The principles of radiography. Electricity as a factor in the treatment of certain chronic diseases of the stomach. Physical treatment of constipation. The place of women in the modern business world as to the future of the race. Physical methods in the treatment of tuberculosis"; reprints.

T. C. Smith, "Some interesting cases"; reprint.

J. M. Eager, "The present pandemic of plague"; published by U. S. P. H. and Marine Hosp. Serv.

G. M. Kober, "Industrial and personal hygiene"; reprint.

L. M. Hurd, "Submerged tonsil"; reprint.

F. K. Boland, "Biographical note of Henry Gray, F. R. S."; reprint.

Lucy Waite, "Clinical significance of uterine deviations"; reprint.

M. J. Rosenau, L. L. Lumsden and J. H. Kastle, Bull. 44, U. S. P. H. and Marine H. S. "The origin and prevalence of typhoid fever in the District of Columbia."

Rosenau and J. F. Anderson, "Further studies upon anaphylaxis." Bull. 45, U. S. P. H. and Marine Hosp. Serv.

Biennial report Board of Health New Orleans, 1906-7.

U. S. Naval Bulletin, July, 1908.

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THE WASHINGTON CITY LIBRARY.—The Committee on "History" would be glad to have the loan of a picture of the Washington City library building that was situated on Eleventh street, N. W., between Pennsylvania avenue and C street, opposite Harvey's, on the site now occupied by the City Post Office.

# Medical Miscellany.

**The Edward N. Gibbs Memorial Prize, $1,000,00.**—Subject: The Etiology, Pathology and Treatment of the Diseases of the Kidney.—The New York Academy of Medicine announces that the sum of $1,000.00 will be awarded to the author of the best essay in competition for the above mentioned prize. Essays must be presented on or before October first, 1909. The three subjects mentioned in the title need not be treated with uniform fulness, but new discovery or fruitful research will be considered the standard of merit. Each essay must be in English, typewritten, designated by a motto or device, and accompanied by a sealed envelope bearing the same motto or device, which shall contain the name and address of the author. No envelope will be opened except that which accompanies the successful essay. The Academy reserves the right, according to the direction of the donors, not to award the prize if no essay shall be deemed worthy of it. The Academy will return the unsuccessful essays, if claimed by their respective authors, or by authorized agents, within six months. An essay must show originality in order to obtain the prize. The competition is open to members of the regular medical profession of the United States. The successful essay shall be the property of the Academy, and, according to the deed of gift, will be published in its Transactions. Essays should be transmitted to the "Committee of the New York Academy of Medicine on the Edward N. Gibbs Memorial Prize."

**Samuel D. Gross Prize, $1,500.00.**—This prize is awarded every five years for the best original essay not exceeding 150 printed pages octavo, on some subject in surgical pathology or surgical practice, founded on original investigations. Candidates must be American citizens. The successful competitor is required to publish his essay in book form, deposit one copy in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and on the title page shall state that the essay was awarded the Samuel D. Gross prize of the Philadelphia Academy of Surgery. The essays must be in English, and be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of College of Physicians, 219 South Thirteenth Street, Philadelphia," on or before January 1, 1910. Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. Unsuccessful essays will be returned to the writers if requested by them within one year. The committee, which comprises Drs. W. J. Taylor, R. H. Harte and DeForrest Willard, reserves the right not to make an award if in its opinion none of the essays are worthy.

**Noise.**—Imogen B. Oakley, in *The Outlook*, October 17, 1908, page 351.—The writer has inquired into the regulations of a number of governments in regard to the prevention of noises. The entire article is well worth reading. She is a member of the Civic Club of Philadelphia on "Unnecessary Noise." She found by actual observation that in her own neighborhood (her residence is on a quiet *residential* street) there was some preventable noise every five minutes on an average between 4 A. M. and midnight. The working men and working women were, however, the persons who made the most complaint about unnecessary noises, because these interfere with sleep.

New York City has taken up the matter in earnest. That city secured a national law regulating steam whistles on the waterways, and has made regulations regarding noises in the city itself. As an instance it may be mentioned that 1,568 flat carwheels were condemned and ordered removed in one month. St. Louis has more stringent laws against noises than any other city in the country; bells and steam whistles and street music are forbidden, and street venders are forbidden to cry their wares. It is said that in Chicago a rubber horseshoe is being used. In Milwaukee also street musicians are not permitted on the streets. Buffalo forbids bells and horns as a means of advertisement; locomotive-are not permitted to whistle except for necessary signals. Des troit forbids whistling from stationary engines, and limits the whistling of steamers and locomotives to the prescribed code of signals. San Francisco forbids the sale of fireworks to be used in the city. Cleveland forbids the sale or possession of toy pistols and combustible fireworks. Baltimore forbids all kinds and grades of steam whistles between 6 P. M. and 7 A. M., and fines persons who permit dogs to bark too audibly either day or night. Massachusetts has a State law regulating the blowing of whistles and ringing of bells. Boston also regulates steam whistling, the cries of venders, and street music. Media, Pa., condemns worn-out, rattling, flat-wheeled cars. Montclair, N. J., has a law against the barking of dogs. Norristown, Pa., has a law against street venders noising their wares. Reading, Pa., requires cats and dogs to be licensed.

Abroad also steps have been taken against unnecessary noise. Berlin limits the number of hours that one may practice on a musical instrument in an apartment house; hand organs are forbidden altogether. The Berlin elevated trains are practically noiseless. The Prussian small towns allow street music one day in the week and require the instruments to be tested on the appointed day by a special officer. Vienna prohibits hand organs on the street. In Italy no one is permitted to grind a hand organ or street piano publicly unless unable to support himself in any other way. It is said that at one time Verdi, the great composer, was so maddened by the incessant grind of wheezy instruments

that he rented for one month every hand organ in Milan, and so had a respite for the month. Paris has banished street music. Bilbao, Spain, forbids the ringing of bells. In some parts of London church bells are not permitted to ring between 9 P. M. and 9 A. M. Newsboys on the great London streets are forbidden to shout the names of the papers. Street music and calling wares for sale is also forbidden for the principal streets.

This subject was considered in an editorial in the ANNALS for July, 1907, p. 251, and p. 321 of the September number, 1908.

**Occupation Diseases.**—Dr. M. A. Starr, *New York Medical Record*, October 10, 1908, says that in Staffordshire, England, over 50,000 persons are employed in the manufacture of china and earthenware. Ten years ago the large number of cases of lead poisoning in that district caused so much comment and criticism that the Home Secretary appointed a commission to ascertain how the danger might be removed. The commission recommended that the percentage of lead in some glazes be reduced and in others eliminated. The manufacturers protested, maintaining that their methods could not be changed. The matter was finally arbitrated, and the result was that lead employed in the process was reduced from 15 and 20 per cent. to 5 per cent. A monthly examination of workers was made obligatory, overalls and head coverings were provided and maintained by employers for women, respirators were to be worn by persons especially exposed, the floors of workrooms were to be sprinkled and swept daily, and a scheme of compensation for lead poisoning was arranged. The trade has been working under these rules since 1903, and the number of cases of lead poisoning has been reduced over one-half.

**Perforative Peritonitis, General, Free and Suppurative.**—Dr. John B. Murphy, Chicago.

The ANNALS is in receipt of this valuable brochure, and it is characteristic of the author in the direct style of expression, exhaustiveness and brilliant treatment of the subject.

Experiments have shown that the lymphatic absorption is much more rapid toward the diaphragm than the pelvis and is assisted by the movements of the diaphragm. There occurs immediately after the introduction of bacteria in the peritoneal cavity, a bacteriolysis, followed more slowly by a phagocytosis, the activity of which is manifested particularly in the anterior mediastinal lymph-nodes. Recovery of the patient depends upon the slow absorption of toxines. Manipulation and trauma of the peritoneum hastens the intoxication.

In the treatment of perforative peritonitis the accentuated points are, first, the position. The Fowler position should be

used from the time the diagnosis is made until convalescence is established. Second. Drainage must be free, preferably by split rubber tubes, never glass or the cigarette drain. Third. Proctolysis. The details of this procedure must be carried out with the utmost precision. The fountain syringe should be raised from six to fourteen inches above the level of the buttocks and allowed to flow through a $\frac{3}{8}$-inch tube at the rate of $1\frac{1}{2}$ pints in forty to sixty minutes. The antistreptococcic serum has proven beneficial. Morphin is decidedly harmful. The chief complication is ileus, of either the adynamic or mechanical type. A secondary operation is occasionally necessary for relief.

C. S. W.

**Sanitary Note from the Tuberculosis Congress.**—The Government Printing Office, Washington, had an exhibit of a ready, cheap and sanitary method of dealing with dirty cuspidors, on a large scale, the device of Dr. W. J. Manning of that office. Cuspidors, 1,400 in number, are cleaned every eight hours; there are three shifts of printers daily. Under the old system of sawdust boxes about 400 barrels of sawdust, costing $100, were used each month, but, of course, these spitboxes were never clean. Now the spittoons, which are made of white metal, are gathered up in bunches, taken on a truck to the washroom, are quickly washed in a large tank of water near to boiling, or quite so, dried quickly by the evaporation of the hot water, and then a solution of corrosive sublimate, with citric acid to retard coagulation of the albumen of the saliva, and eosin as a coloring for the fluid to prevent mistaking it for a harmless liquid, placed in each cuspidor. Under this new plan the cost is about $14 a year, and the results are satisfactorily sanitary.

Credit must be given Dr. Manning for this improvement in dealing with a disgusting and unsanitary subject, but it might be better to furnish such employees as need with combustible spitboxes, which would find their way in due time to the furnace.

**Case of Diphtheria in which 498,000 Units of Antitoxin were Given.**—Reprint from the *Medical Recorder*, Shreveport, La., January, 1905. Dr. W. K. Sutherlin reports the case; woman, age 26; was sick 57 days; for three days in succession received 32,000 units daily. She recovered.

**Comparative Morphology of the Spirochetes of Syphilis and Yaws** (frambesia tropica). Dr. F. F. Russell, U. S. A. Reprint from *Archives of Internal Medicine*, August, 1908. He concludes that the two spirochetes differ from each other; are not alike as was supposed.

**Report No. 2 On the Origin and Prevalence of Typhoid Fever in the District of Columbia** (1907). By Drs. M. J. Rosenau, L. L. Lumsden and J. H. Castle, U. S. Public Health and M. H. S., published as Bulletin No. 44, 1908.

The conclusions of the authors are that much of the typhoid fever in the District of Columbia is imported. Many cases are contracted through contact with persons or with articles handled or soiled by persons in the febrile stage of the disease. The especial prevalence of the disease among children in the District has an important bearing on the spread of the infection by contact. Infected milk is one important factor in the spread of the disease in the District. The Potomac water, filtered, May to September, 1907, was, bacteriologically, of good standard quality and apparently not responsible for the spread of the disease. In the typhoid season of 1907 there were about 200 less cases than in the 1906 period. This improvement was probably due to the improvement in the quality of the drinking water.

The authors recommend that suspected cases should be treated as contagious and dangerous to the community; they recommend isolation, placarding and prompt disinfection of discharges and bedding, &c. Laboratory facilities should be provided free of cost to aid physicians in the early diagnosis of the disease and to determine when persons who have had the disease are no longer a menace to public health by the discharging bacilli. Milk should certified, inspected or pasteurized, under official surveillance, especiallyduring the typhoid season. There should be a law prohibiting the handling or sale of milk or milk products in any place where contamination is liable to occur. There should also be a law prohibiting the care of a case of the fever in any house where food or beverages liable to convey the infection are sold or prepared for sale. Additional storage reservoirs should be constructed, or a coagulant be used during periods of high turbidity, in order to assure a water supply of satisfactory purity throughout the year.

**Under the caption "Desinfektion"** there appeared in July the first copy of a new monthly journal published by Profs. Flügge, Gaffky, Herzberg, Kirchner and Proskauer, and edited by Drs. Lentz and Lockemann, of Berlin. This publication hopes to become a central organ covering the field of disinfection, sterilization and conservation. By having associated on its staff a number of competent coworkers it will not only be in a position to procure pertinent articles, but to give information with regard to patents, statistical and legislative reports and court decisions. It further hopes to embody in its columns recognized and new modes of disinfection of hospitals and other institutions; important current events will also receive brief consideration.

The first article, a contribution by W. Hoffmann, deals with a new method of testing the sterility of catgut in bulk. In view of the clinical cases of tetanus due to catgut material the author has under progress a series of tests of the sterility of catgut for anerobic bacteria, on which he will report on their completion.

E. Seligmann reports on the analysis of two new formaldehyde soap preparations called Morbicid and Morbicid G. For practical purposes the two soaps are of about equal value. Both preparations surpass the killing power of lysoform solutions of double percentage for bacteria.

The remainder of the number is composed of a classified compilation of the literature on disinfection; book and journal article reviews; abstracts of recent laws and regulations, and patents bearing on methods of disinfection, etc.—C. A. PFENDER.

**Cigarette Smoking by the Young.**—By Dr. A. A. Woodhull, late Colonel Med. Dept., U. S. A.—In *American Health*, September, 1908. Dr. Woodhull holds that cigarette smoking by the young is harmful to them. The nicotine, which by heat is changed into pyridin, an equally active poison, acts on the motor nerves abolishing their conductivity, then that of the motor paths in the spinal cord, disturbing the ability to do delicate mechanical work. It is well known that those who train for athletics forego the use of tobacco, at any rate for the time. Tobacco also acts on the vaso-motor nerves causing contraction of the caliber of the capillaries, and persistent use of it restrains development. In cigarette smoking the smoke is inhaled, and to some extent is taken up by the lungs, and thus reaches and acts on the capillaries. In lads and growing youths tobacco arrests the natural elimination of waste and hinders the utilization of fresh material. This explains the fact as observed that the stature of youths who use it is less than that of those who do not use it. There is also the tobacco heart, an irritable heart, often accompanied by intermittent pulse; also a predisposition to neuralgia, indigestion and functional disturbances of vision. There is also developed a greater tendency to acquire an appetite for alcoholic liquors. Premature puberty is induced, increasing the sexual propensity and leading to improper sexual practices. There is a consensus among educators that the use of tobacco dulls the memory and intellect. When a promising pupil in a public school begins to decline in his work it is almost certainly found that he has begun to use cigarettes.

**Pellagra,** by C. H. Lavinder. Published by U. S. Public Health and M. H. S., 1908. This disease has recently been discovered in the southern part of the United States. In southern Europe and in Egypt it has committed ravages; is sometimes

called Lombardy erysipelas and Lombardy leprosy. The cause is said to be eating diseased corn, and the disease occurs only where corn is grown. The reason the disease had not previously been seen in this country is stated to be because our climate is better adapted to growing the grain. The treatment is, of course, prophylactic and hygienic. The corn shows a fungus which, however, has not been identified. The prognosis of the disease is serious.

**Relation of Carcinoma of the Body of the Uterus to Fibroids.**—Dr. J. T. Williams, Boston.—*Boston Med. and Surg. Journal*, Oct. 8, 1908. Based on a collection of 248 cases in which adenocarcinoma and fibroids of the body of the uterus were associated. He concludes that there is a distinct relationship between carcinoma of the body of the uterus and fibromyomata; the relationship probably lies in certain common etiologic factors.

**The Relative Value of White and Dark Meats as Foods.**—From *Modern Medicine*, August, 1908. Adler, in the *Berlin Klin. Woch.*, states as the result of his experiments that for certain patients white meats are better than dark meats, dependent on the quantitative differences in the purin bodies.

**Further Studies on Anaphylaxis.**—By Drs. M. J. Rosenau and J. F. Anderson, of the U. S. P. H. and M. H. S., Bulletin, No. 45. Anaphylaxis is the condition in which the *resistance* to the action of a drug or toxin is diminished. The experiments were on horses and pigs. A full summary with conclusions is given.

**The Relation of Feeding to Anesthesia.**—Hunter (*Modern Medicine*, August, 1908) quotes Hare and Beddard on this subject. The conclusion is that patients should not be starved before anesthetizing, but fed, preferably with carbohydrates, and up to within four hours of the operation (Hare). This is better than beef tea or broths; the kidneys are not required to eliminate salts and animal extracts, and the liver is provided with an abundance of glycogen which enables it to perform its functions properly.

**Examination of the Intestinal Functions in the Aged.**—(*Modern Medicine*, August, 1908.) Schlesinger and Neumann studied this subject by the Schmidt test ration in thirty persons over 60 years old. They found abundance of connective tissue in the stools, which the authors believe is due to defective gastric digestion. This fact indicates that raw or underdone meats should not be eaten by the aged. On the other hand, carbohydrates seem to be indicated.

**Lighting and Shading School Rooms.**—Report of a committee of the Buffalo Academy of Medicine; published in the *Buffalo Med. Jour.*, Sept., 1908. The conclusions are: 1. That windows

at the end of a room, if they face the teacher or pupil, should be shaded if sufficient light can be obtained from the side. 2. Left-handed pupils should face in the direction opposite to that of the right-handed. 3. All shades should be adjustable, admitting light both above and below; the color dark yellow to light green and so arranged as to distribute the light as evenly as possible through the room. 4. Ceilings should be tinted a light yellow; side walls a medium green and without luster.

**Staining of Tubercle Bacilli in Tissue Preserved in Alcohol for Sixty Years.**—Dr. A. A. Thibaudeau (*Buffalo Med. Jour.*, Sept., 1908).—The specimens were of acute tuberculosis, in the Museum of the University of Buffalo; donated by Dr. Austin Flint in 1848. Smears were stained with carbol fuchsin with occasional steaming, decolorized by chlorhydric acid in 70 per cent. alcohol, washed with water and counterstained; they showed typical tubercle bacilli. Sections were also stained with carbol fuchsin; it was found advisable to expose the sections a longer time to the stain. The sections were decolorized as above, transferred to alcohol and cleared in xylol.

**Biographical Note of Henry Gray** (author of Gray's Anatomy).—By Dr. F. K. Boland, Atlanta, Ga. (See *Amer. Jour. Med. Sci.*, Sept., 1908). Reprinted by the publishers of the "Anatomy," Lea and Febiger, Philadelphia.—Gray was born in 1827. His father was a private messenger to Kings George IV and William IV of England. Gray studied at St. George's Hospital. In 1848 he won the triennial prize of the Royal College of Surgeons of England. In 1850 he was appointed House Surgeon to the Hospital. In 1852 he was elected a Fellow of the Royal College, when he was only 25 years old. In 1853 he won the triennial Sir Astley Cooper prize of 300 guineas. In 1853–8 he lectured on anatomy and was surgical curator at St. George's. Much of the success of his "Anatomy" was due to the excellent drawings of Dr. H. Van Dyke Carter; most of these were made from actual dissections made by Carter and Gray. Mr. T. Holmes, afterward an eminent surgeon, read the proof sheets. The first edition was published in 1858. Gray died in 1861. Holmes then became the editor. The present American edition—the 17th—is by Drs. J. C. Da Costa and E. A. Spitzka, of the Jefferson Medical College, Philadelphia.

**The Present Pandemic of Plague.**—By Dr. J. M. Eager, Asst. Surg. Gen., U. S. P. H. and M. H. S. Published by the Bureau. —The paper gives a history of the plague epidemics since 1894, with statistics of morbidity and mortality throughout the world, on land and sea. In the United States the disease appeared as

an epidemic in 1900, 1901, 1902, 1903, 1904 and 1907 in San Francisco, and sporadically in 1907 at Berkeley, Oakland and Point Richmond, Cal., and Seattle, Washington.

**Therapeutic Action of Iodine and its Compounds and Mercury in Diseases, especially exclusive of syphilis.**—By Dr. H. A. Robbins, Washington, D. C. Read before the Therapeutic Society of Washington. Dr. Robbins quotes freely and fully from writers and gives his own experience. Benefit from the use of these drugs is reported in tuberculosis, pneumonia, asthma, muscular rheumatism, arteriosclerosis, lead palsy, human glanders, actinomycosis, &c. He quotes especially from a report by Dr. Wright, U. S. Navy.

**A New Dietetic and Injection Method of Treating Typhoid Fever,** with a report of 138 consecutive cases successfully treated in the last ten years. By Dr. F. J. W. Maguire, of Detroit, Mich. He found that after using milk during the fever the temperature rose, while after using carbohydrates in the form of rice, barley water, &c., the temperature did not rise. This was ten years ago, since which he has not used milk in the fever, but the carbohydrates. He gives sterile water for five to ten days, and when the patient seems to need food, he gives peptonoids well diluted with sterile water, ices and gelatines.

**Revision of International Classification of Causes of Death.**—The second decennial revision will take place next year, largely to facilitate its use in connection with the mortality statistics of the U. S. census for the year 1910. The profession generally should coöperate so that the results of the revision may be satisfactory. The present system may be examined in the annual reports on mortality statistics published by the Bureau of the Census as well as in the registration reports of many States and cities. A copy of a pamphlet on "Relation of physicians to mortality statistics" containing an outline of the classification will be sent by the Director of the Census to any physician on request; and the Director will receive any suggestions for the revision and will submit them to the appropriate committee and the International Commission.

**Winter Cholera; Choleriform Diarrhoea of Cold Weather.**—*Jour. Amer. Med. Ass.*, Oct. 31, 1908.—Dr. O. C. Breitenbach concludes that winter cholera has no specific bacteriologic pathology; meteorologic conditions do not prove to be the exciting cause; the epidemics occur only when factors instrumental in polluting water or milk are present. The disease may coincide with an influenza of the gastro-intestinal tract but is not identical therewith.

**Serum Treatment of Carcinoma.**—*Jour. Amer. Med. Ass.*, Oct. 31, 1908.—Dr. S. Strauss concludes that visceral carcinoma is incurable and fatal in nearly all cases. Superficial carcinoma is curable and amenable to treatment in the early stage. Carcinoma is hereditary; the tendency to its formation is transmitted to successive generations. The disease becomes evident whenever the natural restraining influences are removed. Carcinoma is on the increase; in the State of New York, for 1907, there were over 7,000 deaths from the disease. The serum treatment should be used after every operative case to immunize the system and prevent recurrence. It raises the opsonic index and causes a leucocytosis. The serum should be used in inoperable cases; it relieves pain and ameliorates the symptoms without interfering with the natural functions of the body.

**From Quarterly Bulletin of the Northwestern University Medical School.**—Chicago, Ill., September, 1908.—"A report of some red blood counts in male medical students."—J. R. Neal and W. H. Buhlig. The examination of twenty-four healthy adults between the ages of nineteen and thirty-two, showed that the red blood cells are more often closer to 5,500,000 than 5,000,000, using a dilution of 200 and Toisson's solution.—C. S. W.

"A point in the use of the Tallquist scale for hemaglobin determination."—Walter H. Buhlig states that the Tallquist scale is usually regarded as too inaccurate for good clinical work, but the fault lies in the method rather than in the instrument. Dare's hemaglobinometer was selected as the standard instrument, and the comparison with the Tallquist paper developes interesting data. He finds that the size of the drop is of primary importance and that the error can be attributed to the fact that the drop is too small. He uses two drops instead of one, about the size of the perforation, as recommended by Tallquist. A few of his cases will show that the two-drop method is quite reliable:

| Patient No. | Small drop, per cent. | Large drop, per cent. | Dare, per cent. |
|---|---|---|---|
| 1 | about 80 | below 100 | 99 |
| 2 | above 70 | about 90 | 92 |
| 3 | about 70 | about 90 | 94 |
| 4 | above 70 | above 80 | 83 |
| 5 | above 80 | below 100 | 94 |

This means that the Tallquist can be used to very good advantage for approximate determinations.—C. S. W.

Dr. W. H. Buhlig points out that in the attempt to hurry a preparation of sputum for microscopic examination, the smear is often heated before it is quite dry, producing in this way arti-

facts that are sometimes with difficulty differentiated from tubercle bacillus.

Dr. Buhlig also presents some comparisons of the readings of different sized drops of blood on the Tallquist scale with the results from the same patient on the Dare instrument. Taking a drop of blood of the size of the perforation in the color scale, the readings were practically always low, taking the Dare as a standard. When a spot of twice that size was read, the results obtained agreed very closely with those from the Dare.

Dr. C. A. Elliott found that, in differential counting, a number of cells of different origins are counted together in the group of "large lymphocytes." This term does not apply to a cell entity, but to a group, the members of which have more or less similar tintorial and morphological qualities, which make it quite impossible to accurately differentiate them in stained smears. Certain cell-forms in this group are fairly well identified, including Ehrlich's large mononuclear leucocyte, large and atypical lymphocytes, "lymph schotton," plasma cells, "markzellen," and others, but that there are many other unidentified cells counted in this group seems probable to the author. Until these cells can be definitely distinguished it seems rational to group them together as "large lymphocytes," but with the understanding that it is a miscellaneous group, including cells of widely different origins, and of entirely different significance.

Dr. C. H. Fox reports a case of Vaso-cellular carcinoma of the scalp and skull from the clinic of Prof. W. E. Schroeder.

A piece of the skull $10.5 \times 11.25$ cm. in size was removed by means of a chisel and mallet and the defect was filled by a dense connective tissue that held the brain so firmly that the normal convexity was lost and the exposed area flattened.

The motor centers for the leg, arm and face were all found located anterior to the fissure of Rolando. This was also found to be the case in five subsequent cases in which the brain was exposed.

A discussion of the various methods of opening the skull follows, and attention is called to the use of the chisel and mallet, particularly on the ground of availability and simplicity.

The author believes, after some experience with electrical instruments for this purpose, that ultimately they will be ideal, but that at present there are some difficulties to be overcome.

In regard to the closure of defects in the skull, it is stated that this should not be done unless for some sound indication, as no case is reported in literature where a fatality resulted from the presence of such a defect, and frequently a dense fibrous tissue fills in the defect.

Experimental work done on twelve dogs gave the following conclusions:

1. Connective tissue plays a very important part in the repair of defects of the skull.

2. There may or may not be bony union, but if there is not, the connective-tissue union is firm enough for practical purposes.

3. Old bone, or bone stripped of its periosteum, acts merely as a foreign body, and has little to do with closure of the defect.

4. It is important to have the skin wound and bone incision apart from each other on account of the possibility of a skin infection causing a meningitis.—C. S. W.

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# WASHINGTON MEDICAL ANNALS

## JOURNALISTIC SUGGESTIONS FOR MEDICAL WRITERS.*

By LLEWELLIN ELIOT, M. D.,

Washington, D. C.

An experience with medical journals, for several years, and a previous association with the general public press, have afforded me opportunities for appreciating the difficulties and vexations of the editorial office.

An unfortunate trait in the character of the average man is a desire to see his name in print, and frequently it is an arduous task to convince some writers that their contributions, while excellent from a literary standpoint, are useless from the standpoint of a journal policy. A man of this character will give much study in the preparation of a medical paper; his paper is a complete monograph upon the subject; a clean type-written copy is sent to a journal, which has been selected, not always on account of the special adaptability of the paper, but because the journal has a large circulation and is ranked among the best. In time he may receive a note from the editor returning it with thanks, as "not available for our journal." Now, our author will be disappointed, but let him look at the situation in an unbiased manner. Was the paper such as would hold the attention of the general reader? Did he not go so deeply into the subject that the paper became tiresome? And let him also remember, he is not paying for the printing.

*System.*—Before beginning a paper the writer should have some system, the subject should be divided into headings, there will then be no disconnected portions, and when a heading is completed check it.

*Read before the Medical Society, November 4, 1908.

*Size of Paper.*—Select a paper of proper quality and size, 8½ by 11 inches, write on one side of the sheet only, and always write in ink, otherwise the paper may be rejected; this last is the rule of every printing establishment of independence. There is nothing that irritates an editor more than to have to read, correct or revise an article written on paper which will not take the marking of a blue pencil.

*Titles and Positions Held.*—Whether it is necessary for a writer to append all the titles and hospital and college appointments he holds as a trailer to his name at the head of his paper, or whether it is wise to append a long list of "Exs," is a matter for every author to decide for himself; few care what the writer is as a teacher, an internist or a surgeon; they want to know what he has to say, and in the fewest possible words. Let the paper speak for you and of what account you are, since all the titles in the directory will not help a poor paper to a place in good literature.

*Typewritten Papers.*—It is an act of kindness to the typesetter to make a clean typewritten copy, for mistakes can then be properly charged and admitted.

*Illustrations.*—When illustrations, temperature charts or other matter of this kind are a part of a paper, always make them on separate sheets; temperature records should be made on sheets larger than the ordinary temperature chart; this is troublesome to the author but it is a help to the printer. Illustrations should illustrate, and not show cuts of instruments, apparatus or forms of disease of common use or of daily observation. Dot or dash typing is a thing to be omitted, as far as possible; many printing establishments do not carry a quantity of such type in excess of their needs.

*Journal.*—When you have written a paper it is well to consider what journal is best suited for its publication. An article on Obstetrics should be sent to a journal devoted to that special branch; likewise, one on Surgery, on Otology, on Hygiene, on Ophthalmology, and so on through the entire list, should be sent to journals devoted to those specialties. Of course, this applies only to articles which are exhaustive and not to short, practical papers, which are always welcomed by any journal.

*Send to One Journal.*—When you have selected the journal which you consider the proper one for your paper, send it to the editor direct, accompanied by a note stating that you would like

it published at his earliest date. Never send it to another journal without first notifying this editor of your intention, and also stating to the second editor that the paper has already gone to another journal. This is good faith, and it then gives both editors the right to accept or reject, since matter of this kind is not desired; no journal likes to be second choice. A few years ago one paper was sent to twenty-eight different journals and published as many times. Recently the same trick was played upon some journals; the writers are now *personae non gratae*. If an article possesses any merit or strikes an editor as something that his readers want, he will abstract it or publish it under "Selected Articles;" the system of exchange now in vogue with journals brings everything to their offices, so don't offend in this matter.

As an illustration of this point, let me call your attention to an experience of Dr. Oscar H. Allis, of Philadelphia, which he related at the meeting of The Medical Society of the State of Pennsylvania, held at Cambridge Springs, September 14–17, 1908. Upon request, he sent to each of two medical journals a manuscript copy of a paper to be read at the meeting of The American Surgical Association. Dr. Allis did not think it necessary to notify either of the journals that it did not have the exclusive publication of the paper. The rule of one of these journals, however, was never to accept for publication in its pages as original matter any article not contributed to it exclusively. This notice to contributors appeared in every issue of the journal, therefore the publishers considered the action of Dr. Allis as a breach of faith when they learned of the publication elsewhere, and very promptly and properly sent him a bill for the expense of the typesetting and other work.

Now, some may look upon the action of these publishers as an instance of low commercialism, while others may think the journal publishers were entirely justified in their action, for it was a breach of faith, pure and simple. Had they been informed of the fact that this paper would appear in any journal other than their own they would have, no doubt, refused it admission to their columns. Such being the case, any paper appearing in any journal other than the journal or organ of the Society before which such paper is read should have the following memorandum accompanying, "Published by permission of the Society."

A publisher then knows how to treat the paper without loss of dignity to his journal or offense to the writer.

*Subject.*—Make the title express the subject, and the shorter the better. Do not say, for example, "Puerperal Eclampsia; Report of Sixty-thousand Cases; Recovery in Every One; Treated by Chloroform, Magnesia Sulphate, Veratrum Viride, Elaterium, Venesection," or "Three Interesting Cases." The title in one case is topheavy, while the other one tells nothing, and the busy man will not read the article. The title in the first instance should have been "Successful Cases of Puerperal Eclampsia," or "A Report of Sixty Thousand Cases of Puerperal Eclampsia," or "The Treatment of Puerperal Eclampsia." In the second instance the author should tell what is the class of the "Three Interesting Cases." If they are entirely distinct in type he should make three separate papers.

*Introductions and Apologies.*—Avoid introductions; they are seldom of any value except as pieces of vanity on the part of the writer. There is one thing a writer must never do, and that is make an apology for a paper. It is an admission of mediocrity, and there are few, if any, who will listen to or read it. In my opinion, this is fawning, cringing, begging the question. A short paper is always more appreciated and ensures a greater attention than a long, wordy paper, while a long paper upon a technical or a scientific subject ordinarily falls flat with the general audience.

*Quotations and References.*—In an article for a journal, it frequently will be desirable to quote the writings or opinions of other observers. This can be easily done by making a short abstract, a synopsis of the part to which the reference is made. Quotations tend to weaken a paper, since anybody can read the original article, while few will bother over a quotation. Do not give a long list of references to journal articles or text books, giving the authors, the volumes and the pages. Give the reader credit for having some intelligence, and if he desires to look up the subject he will not take your references without question, but will go over the ground, verify for himself. I learned a lesson in this way on one occasion in quoting from Hamilton "Fractures and Dislocations," and I have always remembered it, and never accept unquestioned anybody's quotation. Dr. Welch, "Acute Contagious Diseases," refers to me as "MacElliot" and as "Dr. Llewellyn, of Washington, D. C." while Roget, "In-

fectious Diseases," writes "Elliot." Winckel credits me with the death of a patient, when, in fact, the patient was well and hearty. Neither of the errors was corrected, because I thought if the subjects were taken up by others they would not accept unquestioned the *ipse dixit* of the authors who quoted.

*Omit Names of Hospitals, etc.*—In writing an article for publication omit in the text the names of hospitals, sanitariums, asylums and homes; do not mention by name instrument or manufacturing houses, because your paper may be taken for an advertisement, or the parties may not be advertisers in the journal, or they may not be on good business terms with the publishers; in either case the editor may exercise his rights and his blue pencil to the astonishment of the author, but you may guess the reason of the erasure. Such references will be placed under "Reading Notices."

Do not give long histories of cases; put the essential points on record; leave out the names of consultants, assistants and others; nobody cares who was present or who assisted, but everybody wants to know what you did and how you did it.

Never insert in an article any matter which has no bearing upon the subject in hand; this will weaken it and detract from the interest you wish to hold; if you want to tell a story or a joke, tell it some other place, and not in your paper.

*Troubles of the Editor.*—An editor of a drug journal wrote to one of his contributors recently, so says *The Druggists' Circular*, August, 1908, about some of his troubles, and the following is a part of his letter:

"Each piece of the copy, no matter how carefully prepared by the author, requires editing in order that the printer may understand how to handle it in accordance with the rules of the printing office. If the typewritten matter is spaced this editing is very conveniently done. If the matter is typewritten without spacing it sometimes necessitates having the entire article rewritten for the printer."

Ruskin was correct when he wrote: "Certainly it is excellent discipline for an author to feel that he must say all he has to say in the fewest possible words, or his reader is sure to skip them; and in the plainest possible words, or his reader will certainly misunderstand them. Generally, also, a downright fact may be told in a plain way; and we want downright facts at the present more than anything else."

*Reprints.*—Reprint your papers and circulate them among your medical friends; if a patient asks for a copy, give it to him; no one keeps such things now; in fact, few keep their journals.

*In Conclusion.*—In conclusion, let me suggest—whatever you have to write, make it short and to the point; cut out what appears to you as beautiful flights of rhetoric; cut out every word that has no place in the paper; take the corrections of the editor in good part; remember his life is at best a thing not to be envied, and that while he is at the head of his journal he must exercise that policy which will bring the greatest returns, in cash and in good words; and, further, take a little advice which, although written more than thirty years ago, is still good enough to paste on any writer's desk. It is:

"Whatever you have to say, my friend,
Be it witty, grave or gay,
Condense it as much as ever you can,
And say it in the readiest way.
And whether you write of household affairs,
Or particular things in town,
Just take a word of friendly advice—
Boil it down."

**Dr. A. F. A. King** said that the paper had interested him very much; the advice given coincided with what might be expected from all editors, and the mistakes alluded to are all too common. A suggestion not mentioned in the paper seemed to him important, namely, to append conclusions at the end of a paper, so as to give at a glance what the paper is intended to demonstrate.

**Dr. D. S. Lamb** said that, so far as the WASHINGTON MEDICAL ANNALS is concerned, his editorial duties are free from the embarrassing feature of refusal of tendered papers; papers or essays having been read before the Society they must be published as a matter of right. Papers not read before the Society have been tendered for publication, but, of course, had to be declined because there is no authority to publish material from outside sources. With respect to the recent amendment of the by-laws limiting the time allowed for the reading of papers, experience has demonstrated its good effect; papers read since its passage have been excellent and sufficient, and the writers have been enabled or obliged, as the case might be, to eliminate long compilations.

He had met with the editorial difficulty on two occasions of papers of ten or twelve pages each, and all in one single paragraph; a request to break up the matter into paragraphs was in one instance not well received.

He suggested the advisability of omitting the various titles, hospital appointments, etc., of the writer from the heading of an article intended for publication; if desired, most journals would cheerfully print them at the head of reprints.

**Dr. I. S. Stone** said that the paper was a timely one; many things are necessary in order to please the editors, and some of us have not yet learned. His first paper, written thirty years ago, was refused by the editor of the journal to which he sent it; but Dr. Stone had never felt humiliated, because it was accepted readily enough by another editor. His experience taught him what every young writer ought to know, that editors are not infallible in their judgments, and many meritorious articles wander far before finding acceptance.

Of course, some papers are so uncouth that they should not even consume the time required for reading, much less occupy space in a journal. The construction of a paper has much to do with its publication value; for himself, he always glances at the first and last paragraphs of a journal article, and if these contain no meat he concludes that there is none between.

**Dr. Williams** took exception to the remarks of the essayist upon the subject of references. In controversial writings upon moot questions references are very valuable, if they refer to the original article quoted. As to Dr. Stone's remarks upon the fallibility of editors, Dr. Williams had had the amusing experience of having a paper "reluctantly declined because it was too long and too technical"; the next paragraph of the letter of declination read, "we have, however, published longer and more technical articles." He was glad to say that another journal readily accepted the article in question.

There are two types of articles: those setting forth the results of original research, which should be sent to journals representing the appropriate special branch to which the matter belongs; other articles, of a popular character or of clinical import, which should be sent to journals intended for the general practitioner.

**Dr. Eliot** had in his experience corrected thousands of sheets of manuscript, and most of it was done with the scissors or blue pencil; most articles could be reduced 25 per cent. without loss of substance. Some writers will, of course, be offended whether the article happens to be good or bad; writers should remember that they are not writing for themselves but for the whole profession, and that the editor has to be guided by his judgment as to the wants of his reading public. In Dr. Eliot's opinion all necessary references can be had at libraries, or, if of sufficient interest to any one reader, they could be surely obtained by writing to the author; it is not necessary to print great lists of authorities.

He fully agreed with Dr. King that there should be conclusions at the end of every paper to serve as a guide to readers.

# ECZEMA IN CHILDREN.*

By T. N. McLAUGHLIN, M. D.,

Washington, D. C.

I have purposely selected for my subject tonight a disease with which we are all familiar, and one which we are frequently called upon to treat, hoping that the discussion to follow will prove interesting and profitable to all of us.

Eczema is an acute, subacute or chronic inflammatory disease of the skin, of a catarrhal nature, characterized by the appearance of erythema, papules, vesicles, pustules or a combination of these forms, attended with burning and itching sensations, ending in discharge with the formation of crusts, or in desquamation.

Eczema is the most frequently observed of all skin diseases, furnishing from 20 to 40 per cent. of the cases reported.

It is difficult at times to make a distinction between Dermatitis and Eczema. According to Pusey, "Eczema is not a substantive disease, it is not a distinct pathological entity; it is rather a group of symptoms in the skin which can be produced by innumerable causes. Crocket says: "I believe, therefore, that it is more logical and practical not to draw such arbitrary distinction, and to concede all cases as eczema which correspond in their morphology and general behavior, irrespective of the cause being tangible, or intangible, external or internal."

When we consider the delicate and sensitive condition of the child's skin, which the new environment, with its variations of heat and cold, its harsh treatment with soap and water, the application of powders, none of them without irritative properties, and the friction and overheating produced by the flannel bands, coarse napkins, and starched clothing, it is easy to understand why so many children show evidences of this disease. It is also frequently the result of internal causes.

Heredity has little influence in the production of eczema.

Buckley says: "While the fact cannot be denied that very many infants with eczema, perhaps the majority, look to be in perfect health, I feel confident in affirming that exceedingly careful medical investigation will always discover something to be corrected besides the disorder of the skin; certain it is that a

* Read before the Medical Society, November 11, 1908.

very rigid investigation and regulation of the diet, mode of life, etc., together with appropriate aid from medicines, accomplishes for these little ones what local treatment has failed to do."

The disease is not contagious. No distinct micro-organism has been discovered. Many forms of bacteria are found, but they are the result of infection, and are an important factor in keeping up the disease.

When there is faulty elimination from the bowels and kidneys, or digestive disturbances, the disease is apt to follow.

Reflex irritation is frequently a cause. Some cases develop during dentition; some resulting from phimosis have been reported.

We have different types of the disease: Seborrheic, Pustular, Erythematous, Vesicular, Eczema Rubrum.

Seborrheic Eczema has been pronounced by Unna to be due to the "mulberry coccus," a parasite which he has described. Some followers of Unna have adopted his view, but it has not been generally accepted, although there are many arguments in its favor.

It develops upon the scalp as yellow, greasy patches and extends down the sides of the face, involving also the sternal and axillary regions. There is usually little discomfort, the itching is not troublesome and it is generally dry. The eruption is superficial, not elevated, sharply defined, with rounded borders.

Pustular Eczema of Scalp.—We find a number of greenish-yellow crusts, which are discrete. There may be only a few, but when numerous they produce a matting of the hair and may form a dense mass, producing a large crust over the scalp. There is very little itching. We find many forms of bacteria, which cause the disease to continue for a long time. The lymph glands are always enlarged.

Erythematous Eczema is most frequently seen upon the face. It begins as a macule or patch, with more or less burning and itching. When fully developed it is of a violaceous hue, slightly scaly, harsh and dry, with some thickening. It may continue as an erythemous type, or the formation of vesicles with oozing may change to an eczema rubrum. Vesicular eczema appears as minute pin-point vesicles upon the face, the neck, fingers and flexor surfaces; they coalesce, forming large patches which mature and rupture, the discharge forming crusts which are yellow-

ish in color. It appears from the sixth week to the third year. We usually find a combination of the papules, vesicles and pustules existing at the same time. The oozing is continuous; there is considerable swelling. The disease may decline as the crusts are thrown off and new vesicles appear.

Eczema Rubrum.—This follows usually the vesicular or pustular varieties. It is characterized by a raw, weeping, red surface, with infiltration and swelling. There is a serous exudation, sometimes bloody, which dries, forming yellowish or brownish crusts. Itching is slight, or intense; there is usually a burning sensation. It develops upon the cheeks and extends to the forehead, scalp, ears, neck, and may occur upon any part of the body. Upon the body the eruption does not form crusts, but the skin is red, thick and scaly. The lymph nodes are always involved, sometimes becoming large and very painful, occasionally suppurating.

Eczema Intertrigo, which is an erythematous or vesiculo-papular variety, is found where the surfaces chafe, as about the groins, nates, flexures, neck, axillae. This may occur a few days after birth, and the surfaces become inflamed, with redness, heat and swelling. It may affect a large area or be confined to a small surface, without discharge or moisture. It may subside in a few days, when the cause is removed, or develop into Eczema Vesiculosum or Rubrum. This form of Eczema usually occurs during the first six weeks of infancy.

*Pathology.*—This is an inflammatory disease involving principally the rete and papillary layers of the skin. It is attended with hyperemia and exudation. In chronic cases there is an extension to the deeper layers.

Stelwagon has so well and concisely stated the views entertained by the majority of dermatologists relative to the pathology of this disease that I take the liberty of quoting him.

"The investigations of most observers and the clinical evidence point, I believe, pretty conclusively to the catarrhal nature of the disease—in other words, that it is a catarrhal inflammation of the skin. The acceptance of an inherently weak or debilitated skin from various causes, and the development and action of some peculiar, possibly varied pathologic epithelial stimuli (Roberts) either from within or without, or from both, best explain the disease process.

"Micro-organisms are, as in almost all cutaneous diseases, frequently found, but those so far discovered are probably accidental and only rarely of contributory or of pathogenetic import; the alleged specific coccus, the morococcus (Unna), in this disease has received but little support (Leredde) and an overwhelming array (Torok, Sabourand and others) of evidence against it. It is not always to be found and is similar to, or, at least, probably in the same class as, the saprophyte, staphylococcus epidermidis albus. The symptoms of itching might suggest a primary nerve involvement as responsible for the cutaneous phenomena, and nerve changes have occasionally been noted (Colmiatti, Leloir), but it is possible that this is wholly secondary."

*Diagnosis.*—Itching is usually a conspicuous symptom; it may be slight or so intense as to be almost unbearable; sensations of burning and heat frequently cause much distress.

No febrile action is observed except in some cases of acute universal eczema.

There is a blending of the inflamed patch of eruption with the healthy skin; the diseased area is not sharply outlined and defined. In the majority of cases there is no difficulty in making a diagnosis, although in some cases of scabies, syphilis and ringworm it may not be clear.

Scabies has a peculiar distribution; the parts most frequently affected are the fingers, the flexor surfaces of the wrists, abdomen and back. There is intense itching, but the presence of burrows, the absence of the tendency to form patches, and usually the source of contagion can be discovered.

Papular Eczema developing about the anus may present the appearance of syphilis. From syphilis it may be distinguished, since the small papular syphiloderm is general in its distribution, arranged in groups; the color is bright or dull red, later brownish in tint. It is seen upon the hands, face, palms, soles and lower extremities and buttocks. There is usually a coryza and cachexia. There is no itching.

Ringworm presents a circular form, fading in the center, and the appearance of the parasite, and with broken hairs when it appears upon the scalp.

*Prognosis.*—Many of these cases are of an acute type but last for years, appearing and disappearing. Under favorable circumstances the disease is curable, many cases yielding readily to treat-

ment; others are rebellious. Any expression of opinion as to the duration of treatment should be guarded.

Of course the extent of the disease, its duration, the predisposing cause and the attention which the patient can receive will influence the prognosis.

*Prophylaxis.*—It has been my observation that those children accustomed to being out of doors, who are permitted to enjoy the fresh air and sunlight, are not the ones we have as patients, for a normal healthy condition is maintained, and their power of resistance to disease is increased. On the contrary, the child that is protected from every form of exposure to heat and cold, and is too heavily clothed, becomes a weakling and is much more apt to present some manifestation of this ailment. The numerous flannel garments have a tendency to keep the skin moist and make the surface sensitive to sources of irritation. Just sufficient clothing to keep the child warm and comfortable, with an abundance of fresh air, are the surest means of keeping the child well.

Breast-fed babies are less apt to suffer from this disturbance than those that receive their nourishment from the bottle. Where there is an excess of fat, proteid, farinaceous food, or when the quantity is excessive, producing a condition of indigestion, with fermentation, represented by a coated tongue, excessive regurgitation, colic, constipation or loose stools with curds, or of a greenish color, this condition requires immediate attention, and the proper proportion of the various constituents of the food must be made, for in just this condition is the eruption apt to appear. Frequently by a change to the country or seashore where the air is more invigorating, the eruption will quickly disappear and these symptoms of faulty nutrition are wonderfully benefited.

*Treatment.*—In older children a plain nutritious diet should be prescribed. Potatoes and oatmeal are frequently productive of this disease, and if used at all should be used with caution. A minimum of salt should be allowed, and pork, salted meat or fish, acid fruits, pastry, gravies and sweets should be abstained from.

If the child is weak, anemic or strumous, iron, cod liver oil and the hypophosphites will prove beneficial. We have no specific for the disease, and the general physical condition of the patient must be carefully studied for a clue to the cause and the line of treatment to be employed.

Arsenic should never be prescribed in the acute inflammatory

stage, and there is seldom any indication for its use, except in the chronic scaly types.

Since itching to some degree always accompanies this eruption, it is necessary to protect the surface so that it cannot be scratched or irritated in any manner. This may be accomplished by placing the child in a sleeveless jacket, or by pinning the sleeves to the outer garments so as to restrict the movement of the arms. Shields of cardboard are also made for this purpose.

Water should rarely be applied, for it produces a maceration of the outer layers of the skin. Sometimes it is necessary for the removal of scales and crusts, but these should be softened by the application of some bland oil beforehand so that as little water as possible will be used.

As the disease is more prevalent in cold, wintry weather, an application of lano cream or some such preparation to the face will protect the child if exposed.

In acute conditions some soothing application should be made, such as—

Calamine Lotion.

| | | |
|---|---|---|
| Calaminae | } | *aa* ℥ii |
| Zinci Oxidi | | |
| Glycerini | } | *aa* ℥i |
| Alcoholis | | |
| Liq. Calcis | | ℥ii |
| Aquae | q. s. | ad ℥vi |

This leaves a sediment forming a coating over the surface.

Lassar's Paste.

| | | |
|---|---|---|
| Zinci Oxidi | } | *aa* ℥ii |
| Amyli | | |
| Petrolei | | ℥iv |

This should be applied several times a day.

| | | |
|---|---|---|
| Zinci Oleati | } | *aa* ℥i |
| Amyli | | |
| Zinci Carb. Imp | | |

The inflamed area should be covered with the preparation and applied as often as necessary to obtain a satisfactory result.

When the disease has become subacute or chronic the ointment of ammoniated mercury, 20 to 40 grains, and preparations of tar are indicated.

Each patient will require special study, and the treatment should be along the line of removing all sources of irritation, whether external, affecting the skin, or internal, interfering with nutrition.

Keating, Cyclopedia of the Diseases of Children.
Morrow, System of Disease, Genito-Urinary Syphilis.
Hyde, Diseases of the Skin.
Pusey, Diseases of the Skin.
Stelwagon, Diseases of the Skin.
Van Harlingen, Diseases of the Skin.
Hart, Diseases of Infancy and Childhood.
Rotch, Pediatrics.

**Dr. T. C. Smith** said that all of Dr. McLaughlin's statements had been entirely orthodox. A few things, however, might be dwelt on with advantage, as, for instance, the influence of generally depraved health as a cause of eczema in children. Under such circumstances parents are apt to overindulge a delicate child in cakes and candies, and thus the eczematous condition is made worse. The etiological position of acid fruits had been spoken of ; this is a most potent cause of eczematous eruptions, and he related the case of a man who presented a violent dermatitis upon an anasarcous leg, the condition having been induced by a single glass of lemonade. The practice of tying the hands of children to keep them from scratching eczematous lesions seemed to him little short of barbarous. Prometheus, bound, could not have suffered worse torture than children with itching eruptions and hands confined. Several prescriptions given in the paper will effectively relieve the itching and render the binding of the hands unnecessary. As for internal medication, no one remedy is better for universal application than the old citrate of iron and quinine.

**Dr. S. S. Adams** said that the tying of children's hands was undesirable, but unavoidable in many instances ; a cure cannot be effected until the scratching nails have ceased irritating old lesions and inoculating new ones. Children with eczema might be divided into two classes, those under and those over two years of age. In the first class the feeding of cakes and candies does not obtain and the cause must be sought in some fault of metabolism ; careful study may reveal that the source of trouble lies in apparently proper food. Many mothers have good supplies of milk of requisite richness, but the milk, through some inherent cause or hygienic defect, may be poisonous to the child. In such cases, treatment directed against the eczema will be useless until the food is changed. Those cases of eczema which appear at teething are not due to the eruption of teeth, some prior cause may always be found.

He related a case of this sort which was seen in a child fed by a wet nurse, whose milk was found to contain from 6 to 8 per cent. of fat ; an eczematous eruption might be expected under the circumstances. Too long nursing may be another cause ; when eczema arises from poor milk weaning will quickly cure the condition.

At the Children's Hospital the children brought there with eczema in the majority of instances have been fed upon some of the commercial infants' foods, or there has been a too varied general diet. As to the treatment in the hospital, the first step is to remove all of the scabs ; no ointments are applied until this is done. Bicarbonate of potassium, one ounce, dissolved in a gallon of water will be found a soothing lotion to use in loosening the scabs ; at times it is necessary to apply a poultice of flaxseed meal, or gauze saturated with olive oil. After all scabs have been removed, a soothing bland ointment is applied : oil of cade (a half drachm) in vaseline (one ounce) will usually relieve the itching.

By following out the rules laid down by Dr. McLaughlin and by carefully selecting the diet these cases are usually most satisfactory to treat ; most cases may be cured in the course of two weeks.

**Dr. Carr** agreed with Dr. Smith in thinking the tying of children's hands in itching diseases cruel. While it is necessary to prevent further traumatism, harmful scratching may be prevented by placing the hands in gloves or bags. Tying the hands is almost worse than the disease.

**Dr. Acker** thanked the essayist for presenting a very timely paper ; the subject is one of great importance to the general practitioner, to whom most of such cases come for treatment. Dr. Acker desired to emphasize the part that constitutional predisposition has to do with the etiology of eczema ; somewhere in the family history will usually be found instances of rheumatism, gout or similar nutritive disorder ; some digestive disturbance will usually be found to be the exciting cause acting after the before-mentioned predisposing causes. Climatological conditions are also to be taken into consideration. He related the case of a child who was a victim of eczema as long as he remained in Washington, but who speedily recovered as soon as he was taken to Atlantic City ; another child had eczema whenever he was taken to the Massachusetts coast and recovered upon returning to Washington. He affirmed his belief in dentition as a cause of eczema in children. The treatment had been efficiently described by the essayist and other speakers ; he had found the ointment of white precipitate good if used sufficiently diluted ; oil of cade should also be well diluted. There could be no doubt that the hands must be restrained in some cases ; gloves and bags will not always be sufficient to protect the lesions.

**Dr. Kober** said that some years ago a French author had pointed out an apparent relation between the feeding of milk from brewery swill-fed cows in children and the eruption of eczema among the infants so fed. Hyperacid urine may also be a cause of eczema about the genitalia of young children.

**Dr. S. S. Adams** called attention to the effect of diapers washed in caustic-alkali washing powders in producing eczema rubrum about the genitalia of infants.

**Dr. Acker** spoke of the good effect of feeding buttermilk to children suffering from eczema.

**Dr. McLaughlin** said that the subject was too broad to be discussed fully in a paper limited to twenty minutes, so that many important considerations had to be omitted from the essay. No specific remedy or line of treatment can be given ; every case must be a law unto itself. The rôle played by too rich food in the etiology had been insisted upon in the paper. He had noticed the causative effect of diapers washed with washing powders, and he also called attention to eczematous eruptions set up by boric acid when used to dress the umbilical cord.

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The County Society and the Public.—We want to make the influence of the county society so strong that no decent, self-respecting physician can afford to be without its portals. We want to make its local influence so great that no legislator can ignore its warnings, and when we ask in the name of humanity that certain laws be enacted for the general good they will heed our demands and be only ready to do our commands. * * * Members of societies should make it their duty to spread the knowledge of what the profession at large is doing for the people in a disinterested way. Teach them that physicians are high priests of health and not sordid creatures who try to get rich from their infirmities and frailties. Show them that our greatest good can be rendered in preventing diseases. Impress on their minds that it is worth more to prevent an individual from having tuberculosis than it is to treat him for a year or two and then have him die, or perhaps to prolong his sufferings for three or four years. Never let the people forget that the vast majority of diseases are curable and preventable if taken early enough, and that we are charging them for superior knowledge and not for pills and prescriptions ; that their health and that of their family is as important as their farms, their stocks or their homes.—*Jr. A. M. A.*

# GALLSTONES; ANALYSIS OF SIXTY-ONE CASES.*

By D. S. LAMB, A. M., M. D.,

Washington, D. C.

A series of sixty-one cases of gallstones is small as compared with some series that have been reported, but even this small number, I think, is instructive. In many of these cases there was no suspicion of the presence of the calculi; and this is readily understood when we recall the fact that symptoms of gallstone disease are most often caused not by the presence of the stones in the gallbladder but by the attempt of the stones to escape from the bladder through some natural or other opening that is smaller than the stones themselves. In none of the cases was there any surgical intervention.

These stones were all in persons over 30 years old except in three cases, one a girl of 15, and two men, aged, respectively, 27 and 29 years. The proportion was three in persons between 30 and 40 years; one between 40 and 50; nine between 50 and 60; seven between 60 and 70, and two between 70 and 80. According to this series, therefore, the ages at which gallstones are most often found is between 50 and 60.

With regard to the early age at which they are sometimes found the following may be stated. Hein, in 395 cases of gallstones, found only one case under 20 years; Durand-Fardel, in 230 cases, found only two cases under 20 years; Harley, in 1,000 cases, found only ten under 20 years; Recklinghausen, in 141 cases, found two under 20 years. In this series of sixty-one cases there was one under 20 years. In 1,819 cases, therefore, the proportion under 20 years was about eight-tenths of one per cent. In the case of the girl 15 years old, a colored girl, I may add that she died of typhoid fever in 1888; I reported the case to the *Medical News*. There were 42 stones in the gallbladder, and of course they must have been formed before the access of the fever. There was another interesting feature of this case, namely, that there was a large cyst of the right ovary; showing once more that ovarian cysts occur in colored persons.

It may be stated here that a number of writers report the presence of gallstones at birth or as having been discharged within a

*Read before the Medical Society, November 12, 1908.

few months after birth, and Dr. Still further states that he has found gallstones in the stillborn. This is particularly interesting as bearing on the question whether the presence or action of bacteria is absolutely necessary to the production of the stones, since theoretically, at any rate, the alimentary canal of the newborn and stillborn is sterile. Sutton, however, says that the prenatal calculi are not cholesterin calculi.

As to sex, in the sixty-one cases the proportion was 21 males to 24 females ; in sixteen cases the sex was not stated. The proportion of two males to three females is what is generally stated. Some writers find, however, a proportion of one male to three or even four females. Pregnancy appears to be a predisposing factor. Naunyn found that 90 per cent. of women with gallstones had borne children.

A history of hepatic colic is often absent ; in only ten of the sixty-one cases was there such a history, and in seven cases it was stated that there was no such history.

The stones varied much in number, size and weight. In most cases only one stone was found, exceptionally there were 25, 42, 57, 68, 70, 75, 82, 97, 120, 215, 222, 320 and 333. Most stones were small, especially where a number were found together ; the largest stone was 1½ inches long. As to weight, the weights of the larger single stones were 75, 100, 131, 143, 154, 182, 185 and 394 grains.

The composition, so far as examined, was mainly cholesterin, with small percentages of lime salts and soda salts, carbonates and phosphates. It may be added that gallstones of the ox and pig do not contain cholesterin ; those of the pig consist of 90 per cent. of hyocholate of calcium.

As to the mode of formation of gallstones I have little to say. The subject has been written up very much of late years. One thing is certain, namely, that calculi can be formed in the ducts of the liver itself. The nucleus of the stone usually consists of an insoluble combination of bilirubin with calcium. According to Chittenden, Hammersten has shown that the bile flowing from the liver contains 48 to 160 parts cholesterin in 1,000 of bile, while that from the gallbladder contains as much as 786 in 1,000, and attributes this more concentrated state of the bile in the gallbladder to absorption of water and diffusible salts from the bile while in the bladder. The bile from the liver rarely contains

more than 3½ per cent. of solid matter, while that from the gall-bladder contains up to 17 per cent. Still it has been found by experiment that the mere concentration of bile in the bladder will not cause the formation of gallstones even when the cystic duct is tied, showing that something more than the concentration is necessary.

The bile from the liver contains 1.8 per cent. of bile acids, the glychocholic and taurocholic acids, while the bile in the gall-bladder contains 10 per cent. And it is the bile acids, of course, which hold the solid matters in solution. While these acids are the natural solvents of the solid matters of bile, it is a question whether a stone once formed can be dissolved while still in the human body.

As gallstones consist mainly of cholesterin, and the stones are sometimes formed in the ducts of the liver itself, it becomes a question as to the conditions under which cholesterin can be formed. I will not discuss this question; I merely raise the question. Cases are reported in which the gallbladder was absent, and stones were formed either in the ducts of the liver or the hepatic or common duct. Brown reports such a case (*Trans. Med. Ass., Missouri*, 1887, p. 36–38) in a man, age 42, who passed gallstones by stool, and who died with calculi impacted in the common duct. There was no sign of his ever having had a gall-bladder. Of course in such animals as the solipeds, the horse, donkey, etc., as also in the elephant and mouse, none of which have a gallbladder, the stones must be formed in the ducts.

A few of the cases in the series of sixty-one may be briefly detailed. The cases that showed the more common conditions may be passed over, such as discharge of calculi through the ducts or even through unnatural passages; impaction in the ducts; inflammation and ulceration of gallbladder; dilatation of ducts of liver from mechanical obstruction; atrophy of gallbladder after occlusion of cystic duct.

Obstruction of the bowel is of more interest, since the question arises in each individual case as to how the stone reached the bowel; whether it passed through the natural ways by causing dilatation, or whether it ulcerated its way through into the bowel. It is far from easy to imagine a stone that is large enough to cause obstruction of the bowel making its way through the cystic or common duct, the caliber of each of which is so much

less than that of the bowel and the dilatability of which is also much less. But there are cases reported in which no history of previous difficulty could be ascertained and in which, therefore, we are to presume that the stone made its way through the natural passage. It has been suggested that stones add to their size during transit through the bowel by deposition from the intestinal contents; but I believe that such additions are of no account unless the stone remains a long time in the bowel, which, I also believe, is rarely the case. Besides, the stones as passed are, as a rule, simply biliary calculi devoid of layers or intestinal origin. Obstruction takes place anywhere in the intestine, high up or low down. In one case of the sixty-one, a fat man, without any history of hepatic colic, the obstruction was followed by some peritonitis, but he recovered; two stones were passed, and these showed that there were or had been others of like size; they measured, respectively, 1 inch and 1⅛ inch, and weighed 154 and 182 grains.

In one case of Hodgkin's disease there was a mass of inspissated bile in the gallbladder.

The probable relation of cancer to gallstones has been much discussed, more especially primary cancer of gallbladder. In eighty-four cases of primary cancer of gallbladder Courvoisier found calculi present in seventy-four, with the probability of their also being present in four more. In one hundred other cases Musser found gallstones in sixty-nine. Jayne, in thirty other cases, found gallstones in twenty-three. Ames, at Johns Hopkins, found gallstones in 90 per cent. of cases of primary cancer of gallbladder. The proportion of cases of gallstones in cancers elsewhere than in the gallbladder is markedly less, but is still suggestive of some relation between the malignant disease and the formation of the stones. Perhaps it is possible that either condition may be causative of the other. Williams found eighteen cases of gallstone in 281 cases of cancer. Brockbank found forty-four in 777 cases of cancer. In one series of forty-four cancers of the breast there were seven cases of gallstone. In seventy-nine cases of uterine cancer were five cases of gallstone. Beadslee reports gallstones in all of the four cases of primary cancer of liver; the stones were found in the gallbladder, while no stones were found in thirty-six cases of secondary cancer of liver. He further reports that in thirteen other cases

of primary cancer of the liver gallstones were present in eleven, while in sixty-four cases of secondary cancer of liver gallstones were found in only two. Primes, in another series of cases of malignant disease of gallbladder, found gallstones present in 91 to 95 per cent. It seems clear, therefore, that primary cancer of liver or gallbladder bears a distinctly causative relation to the formation of gallstones, but in what way causative I believe that as yet we are not prepared to state. Williams insists that gallstones are found most frequently in persons affected with cancer or tuberculosis, or in the insane.*

In the series of sixty-one cases of gallstones cancer was present as follows : one case of cancer of uterus and ovaries ; one case of cancer of pancreas, in which the stone was impacted in the cystic duct in a man 39 years old, with 320 calculi in the gallbladder ; one case of cancer of liver, in a man, age 61, in whom the gallbladder was thickened ; another case of cancer of uterus ; one case of cancer of stomach and omentum, a woman of 66, the gallbladder was much thickened; another case of cancer of pancreas, a man of 73, the tumor causing obstruction and dilatation of gall ducts and there were four stones in the gallbladder. This makes six cases in sixty-one, which is 10 per cent. As in some of the sixty-one cases the history was quite defective, it is possible that the percentage was actually higher than as stated. In one case there was a primary tumor of gallbladder, secondary tumors of liver ; probably cancer ; a woman, age about 50, 57 gallstones in gallbladder.

In one case in which a stone was impacted in the common duct an abscess of the liver developed, due, of course, to micro-organisms. The gallbladder in this case was practically obliterated. There was a history of biliary colic.

The relationship of gallstones to typhoid fever has also been much discussed. In one of the sixty-one cases the man died of typhoid fever and 215 calculi were found in the gallbladder. In another case there was biliary colic coinciding with or following typhoid fever with hepatitis; this man passed calculi, as many as 11 in one month. I have already mentioned the case of typhoid fever in a girl of 15; she died of the fever; 42 stones were found in the gallbladder. In another case a man, age 29, died of ty-

* Dr. I. W. Blackburn, Pathologist of the Government Hospital for the Insane, informs me that gallstones are found in about one in eight of the post mortem examinations made at that Institution.

phoid fever; 82 stones in gallbladder. In all these four cases, however, the fever appears to have followed and not preceded the formation of the stones. I may add that Dufourt reports nineteen cases of gallstones, in all of which there was typhoid fever. It is supposed that in these cases the fever was causative, through the access of micro-organisms to the gallbladder.

In this connection I may refer to an article by A. J. Lartigau that appeared in the *California State Medical Journal* for January, 1906. Lartigau reviews the whole subject of bacteria in relation to gallstones, and made many experiments to confirm or disprove some conclusions reached by other experimenters. His conclusions may be stated as follows: that the introduction of aseptic substances into the gallbladder is not causative of gallstones, nor even of cholecystitis. This is confirmatory of the work of others. It seems certain, therefore, that some sepsis is needed; something more than the mere presence of foreign bodies. Here may be mentioned the fact that Naunyn had actually introduced small particles of cholesterin and billirubin-calcium into the gallbladder of dogs after tying the cystic duct to prevent the escape of these particles. In the course of a few months the particles disappeared, had evidently been dissolved.

Lartigau also found that the introduction of pathogenic organisms of different kinds (and it did not seem to make any difference what kind, the action of all seemed to be alike) was followed in a proportion of cases by the formation of calculi; chronic cholecystitis was also caused, and the conclusion was that the bacteria caused the cholecystitis and the cholecystitis caused the calculi.

His third conclusion was that bacteria can reach the gallbladder in either of four ways: by ascending the ducts, through the portal circulation, through the general circulation, and directly from the peritoneal surface. The experiments as conducted seemed to prove access by either of the four ways mentioned.

I might add to the above the experiment of Dr. S. P. Kramer, of Cincinnati (*Jour. Exp. Med.*, 1907, IX, p. 319), who mixed human bile with bouillon, sterilized the mixture, and inoculated three portions respectively with the colon bacillus, typhoid bacillus and staphylococcus pyogenes aureus; there was no result from the staphylococcus, but with both the bacilli, precipitates formed, consisting of calcium and magnesium phosphates, calcium

carbonate, biliary coloring matter and crystals of cholesterin; in six months the precipitate constituted a soft stone. The addition of cholesterin to the mixture at the outset resulted in a more prompt and more marked result.

**Dr. I. S. Stone** said that the paper scarcely presented an opportunity to speak to the operative side of the subject. It is common observation that gallstones may not cause symptoms, and this led to the repetition of the statistical statement that three-fourths of all persons have gallstones during the course of life. The symptoms are so very elusive that it is often impossible to reach any definite conclusions about a given case during life. There can be no doubt that gallstones do form at times in the hepatic biliary channels; in two cases he had observed this to be the case. The paper had also called attention to peculiar shapes and positions of the gallbladder; he had hoped to hear statistics as to the occurrence of the very difficult buried-bladder cases; such cases lead the surgeon to suspect there may be no gallbladder at all. He thought that the common duct could very seldom be successfully explored by passing a sound from the gallbladder; stones may thus escape observation by relying on this method of examination and give rise to post-operative trouble. The pathological side of the subject had been well presented by the essayist. Dr. Stone recalled a case reported to the Society some months previously by him. In this case there had been perforation of the gallbladder and two liberated calculi had wandered, one into the duodenum, one into the transverse colon.

**Dr. Vaughan** had enjoyed the paper. It is well conceded that calculi may form anywhere in the biliary apparatus. He spoke of a case in which stones were found throughout the liver; sections cut at intervals of a half inch everywhere passed through stones. As to the possibility of stones that pass by the natural ducts being large enough to cause obstruction of the bowel, he was inclined to doubt it in most instances, believing that such stones usually escape by ulceration. He believed, however, that the common duct may be dilated sufficiently to pass such a stone, because he had seen a common duct distended to the extent of 2½ inches in diameter, there being obstruction below. This case was an exception to Courvoisier's law. Dr. Vaughan spoke of a case which occurred in his practice last winter. The patient was a woman, eighty years old, who, one year before the attack described, had had a seizure resembling biliary colic; she became violently ill with abdominal pain, followed by vomiting of blood and melaena; later there were symptoms of partial obstruction of the bowel, and finally complete obstruction occurred. On operating he found a gallstone impacted in the ileum so tightly as to completely occlude the bowel; it was removed without any difficulty, but, unfortunately, the patient died.

**Dr. I. S. Stone** suggested that in most instances of obstruction from gallstones, the gallstone is merely the nucleus for further accretions after the calculus has reached the bowel.

**Dr. Kober** said that there appears to be a growing tendency to ascribe infection as the basic cause of the formation of gallstones, particularly infections of the gallbladder with bacillus coli and bacillus typhosus. Experiments have been made to determine the effect of urotropin as a disinfectant of the biliary passages, the evidence indicating that the desired effect is attained. The routine administration of hexamethylenamin in typhoid fever would, therefore, be indicated as a prophylactic measure.

**Dr. G. Brown Miller** said that gallstones may cause obstruction of the bowel by mere irritation, without the necessity of being large enough to obstruct by bulk. Olshausen has reported a case of acute intestinal obstruction, caused by the spasmodic contraction of the bowel around a comparatively small biliary calculus.

**Dr. D. S. Lamb** said that it is possible for gallstones to serve as a nucleus for accretions in the bowel, but obstruction of the bowel follows too soon after the passage of the calculus from the biliary passages in many instances to allow of the possibility of growth by accretion in the intestine; in many cases, also, calculi are passed from the bowel without any sign of accretion. Gallstones may enter the bowel by ulceration and cause obstruction in the lower end of the ileum where the gut normally becomes somewhat contracted. The case mentioned by Dr. Vaughan in which the common duct was dilated to a diameter of two inches and a half must have been a very exceptional one.

## CASE OF TUBERCULAR OBSTRUCTION OF THE BOWEL.*

By J. R. WELLINGTON, A. M., M. D.,

Washington, D. C.

Anita B., white, age 10, first entered Children's Hospital, March 9, 1908, for removal of tubercular glands of the neck. She was from Virginia, but came to the hospital from one of the city orphan asylums, where nothing of her previous history was known. In the middle line of the abdomen were two scars of previous laparotomies, each five or six inches long, one above and one below the umbilicus. She had no recollection of having been operated upon and nothing could be learned as to the reasons of these operations. It was thought probable that they had been

*Reported, with specimen, to the Medical Society, November 4, 1908.

for tubercular peritonitis, which afterwards was found to be true. The cervical glands were removed and she left the hospital June 12.

July 31 she was readmitted with a history that ten days previously she had had a chill, vomited and had considerable fever. At the same time she had a marked pain in abdomen, and it was with great difficulty that a movement of the bowels was obtained. Two days before admission she had a similar attack with persistent vomiting and constipation. Yesterday she had several movements after taking one ounce of castor oil.

She was admitted to the service of Dr. Frank Leech. She was fairly well nourished and had apparently lost no flesh since her previous residence in the hospital. There was no evidence of disease of the lungs or joints. The abdomen was somewhat distended, and over the region of the appendix a hard mass about the size of a small orange could be felt. The temperature was normal and the pulse ranged from 80 to 120. The bowels were moved by means of castor oil. The urine was negative. She was free from pain; nor did she vomit after admission.

I was asked by Dr. Leech to see her with him, and we concluded from the history of the two attacks already mentioned and from the presence of the tumor that she was suffering from chronic intestinal obstruction due to some tumor in the region of the ileo-caecal valve, and an exploratory operation was decided upon August 4. An incision was made over the tumor. The abdominal contents seemed normal except that the appendix and ileo-caecal valve were involved in a hard nodular mass about the size of a hen's egg. No enlarged glands were discernible except two or three in the immediate neighborhood of the tumor. The ileum above was considerably distended, while the caecum was collapsed. Not knowing at that time that the previous abdominal trouble had been tubercular, I was uncertain as to whether the growth was tubercular or sarcomatous.

A resection was decided upon, and this was done, keeping well away from the diseased into healthy bowel, followed by an anastomosis, and the abdomen was closed without drainage. At the close of the operation the pulse became very weak, and she was given salt solution under the skin before leaving the table. During the next two or three days her condition was rather critical. Salt solution was given continuously *per rectum* by the drop method and as much as 5½ pints in 24 hours were retained.

On the fourth day, there being considerable distention, a turpentine enema was given, which brought away some fecal matter and much gas. On the fifth day nourishment by mouth was begun and the salt solution discontinued. There was a slight fecal discharge from the wound, which lasted for only a few days, and from that time her convalescence was uninterrupted. At present she has gained in weight and color, her bowels move regularly and she seems absolutely well, except for a small superficial ulcer of the skin at the site of the incision.

Dr. W. W. Wilkinson kindly examined the specimen and made the following report: *Intestine:* All the coats are much thickened; considerable hyperplasia of connective tissue elements; areas of diffuse round cell proliferation; and tubercles. No distinct giant cells seen. *Mesenteric Glands:* These are caseous and typical of a tubercular process. *Diagnosis:* Hyperplastic tuberculosis of intestines.

**Dr. Balloch** said it had been a pleasure to hear the report of the case, and he wished to congratulate Dr. Wellington upon having operated at a favorable time; many surgeons would contend that as long as fecal matter is passing through, the operation should be delayed, and while waiting for complete obstruction the favorable time may pass. The specimen was an illustration of the advantage of making early exploration and an argument for that practice.

**Dr. I. S. Stone** was particularly interested in the fact that the child had had a previous operation for tubercular peritonitis; some months ago he had reported a case of his own in which an operation for tubercular peritonitis had been followed two years later by a second operation, at which time extensive mesenteric involvement was encountered, associated with tubercular masses at the cecum; in this case the cecum was resected with recovery of the patient, but now there is some evidence of recurrence. He has found a number of cases where the tendency to recurrent obstruction was demonstrated. The lesson to be learned is that tubercular peritonitis is not always, and perhaps never, simply a peritonitis, but that it is an expression of tubercular invasion which chances to be superficial in its distribution.

**Dr. Wellington** said that the operation for tubercular peritonitis must have been several years prior to the operation performed by him; the patient was an intelligent child of ten years and had no recollection of it. With respect to tubercular peritonitis the Mayos habitually look for some primary focus from which the peritoneal invasion takes origin; in females this focus may be the fallopian tubes; in either sex the appendix may be at fault; in either case they remove the offending organ.

# STAPHYLOCOCCUS CYSTITIS WITH REPORT OF A CASE DUE TO STAPHYLOCOCCUS PYOGENES ALBUS ASSOCIATED WITH STAPHYLOCOCCUS CITREUS.*

By WILFRED M. BARTON, M. D., and RALPH A. HAMILTON, M. D.,

Washington, D. C.

Much has been written in the last decade concerning gonococcus, typhoid, influenza, bilharzia and syphilitic cystitis, and the association of bladder inflammation with syringomyelia, appendicitis, and various other pathologic conditions.

Contributions to the pathology and etiology of cystitis have likewise been abundant, and the bacteriological study of the urine in bladder inflammation has resulted in the accumulation of a voluminous literature.

The staphylococcus has been acknowledged, for the past fifteen years at least, to constitute one of the etiological factors of chronic cystitis from a bacteriological standpoint. Nevertheless the literature of the subject is not too surcharged with cases to admit of the relation of the one to be presently described, since it appears to be the only case so far recorded where an association of staphylococcus pyogenes albus and citreus has existed as the unique bacteriological finding.

For this reason we take the liberty of reporting the following case, and following it with a short résumé of the subject of staphylococcus infection of the mucous membrane of the bladder.

Case: Helen L., white, aet. 35, widow. *Previous History.*—Menstruated at 13; normal in duration and quantity. Had typhoid fever and pneumonia at 17, married at 18. Had two children, who are now living. Has had ten miscarriages.

*History of Illness.*—In childhood, patient suffered intermittently with irritability of the bladder, frequent desire to urinate and backache. These symptoms eventually disappeared. Ten years ago, following a miscarriage, she began to have general abdominal pains, worse in the hypogastrium, with headache, frequent desire to urinate and incontinence. Following the incontinence, which persisted for two weeks, came retention of urine, which lasted intermittently for six weeks. She remained in bed for

*Read before the Medical Society November 4, 1908.

over a month, and during this period was examined by a physician, who discovered double salpingo-oophoritis and advised an operation. She objected to an abdominal section and none was performed.

She apparently never thoroughly recovered from this attack of peri-uterine and bladder inflammation. Attacks of some severity, of a few days' duration, occurred intermittently about every two months. In August, 1907, she had a miscarriage at six weeks, and immediately after the cessation of the hemorrhage she developed fever, pain in the hypogastrium and frequent desire to urinate, with slight dysuria. Walking was painful. This attack lasted about three weeks. A mixture was taken by the patient at this time, containing fluid extract of belladonna, benzoic and boric acids and opium, and this treatment produced a brief amelioration, which was followed by a relapse, in which nocturnal pain in the bladder and pain in the back were prominent features.

For the following year, and up to August, 1908, she had acute exacerbations of the bladder difficulty every month, the attacks lasting one or two weeks. In the interim between the attacks she was never entirely free from bladder symptoms. There always remained some sensation of burning in the bladder. She became nervous and complained of headache and insomnia. The maximum quantity of urine which the bladder contained at this time was 90 c.c., or 3 ounces.

On August 5, 1908, under strict aseptic precautions, the bladder was catheterized and 50 c.c. of urine were drawn in a sterile flask.

The specimen was taken to the bacteriological laboratory of Georgetown College and analysis showed macroscopically a transparent amber-colored urine of normal odor and with a slight sediment. The reaction was sharply acid; specific gravity 1,024; urea normal in quantity; a suspicion of albumen and no sugar. Microscopic examination revealed the presence of bladder epithelium, a few leukocytes and numerous micrococci. Casts were not present.

*Bacteriologic Examination.*—A drop of the urine was placed in a bouillon tube, from which agar plates were inoculated and incubated at 37 C. After twenty-four hours' incubation a number of fine white pinpoint colonies made their appearance. Further

incubation showed them to be made up of two varieties, one, a white, glistening, slightly elevated colony ; the other, somewhat larger, assumed a pale yellow color. Stained preparations from each colony showed small Gram positive micrococci arranged in clumps, morphologically identical on microscopic examination. The ordinary laboratory media were inoculated and their subsequent behavior corresponded to the cultural characteristics of the staphylococcus pyogenes albus and citreus.

The treatment began August 15, and consisted of auto-lavage of the bladder, with one liter of warm (1 to 5,000) solution of nitrate of silver introduced 500 c.c. at a time, this being the maximum capacity of the bladder under pressure. Each quantity was retained in the bladder five minutes. Daily lavage was kept up till August 27. A sense of considerable distention and pain accompanied the irrigation at first, and it was with difficulty that 500 c.c. were introduced. From August 27 to September 15 the bladder irrigations were kept up every other day. By September 15 the subjective symptoms had entirely disappeared and the irrigations were suspended.

September 30 the patient took cold after an exposure, and a slight return of the cystitis symptoms was noted. Irrigations were resumed twice weekly and the symptoms disappeared. They have been absent up to the present time.

Bacteriological investigations of the urine in cystitis began in 1886, when Bumm[1] published his researches upon the etiology of bladder inflammation occurring in the puerperium. The organism which he found in all his cases was described as a diplococcus resembling the gonococcus in its form but distinguishable from it by taking the stain of Gram.

In cultures it resembled the staphylococcus pyogenes aureus. Inoculated into tubes containing sterilized urine, it did not produce ammoniacal decomposition. Injected into the bladder of dogs and goats it failed to produce cystitis unless the bladder was subjected to previous or subsequent irritation. It would appear that the microorganism isolated by Bumm belonged to the class of pyogenic cocci, and, assuming this to be the case, his communication stands as the first report of their presence in the urine to be found in the literature.

Soon after the publication of Bumm's researches, bacteriological investigations of the urine in cystitis rapidly multiplied.

Michaelis[2] in the same year confirmed the experiments of Bumm and reported that he had found the same organisms.

The researches that immediately followed those of Bumm and Michaelis failed to show the presence of pyogenic cocci in the urine of cystitis cases and soon demonstrated that in the majority of instances of chronic cystitis the infection is bacillary.

Bouchard[3] in 1879 had already described a bacillus in the urine. This bacillus was, according to Charrin[4], in all likelihood the bacillus coli communis, which organism is now known to be bacteriologically accountable for about 50 per cent. of the cases of chronic cystitis.

Nine years after Bouchard and one year after Bumm, Clado[5] published his researches upon septic bacteria of the bladder. Clado refers to twelve species of bacteria which he found in his investigation. The only one which he specifically describes, however, was a small polymorphous motile bacillus, not liquefying gelatin. He does not mention having found pus organisms.

In the same year, 1887, Halle[6] reported a case of cystitis accompanied by infection and culminating in death, in which the urine, and also the pus from multiple abscesses, contained a pure culture of an organism which he considered identical with the bacterium of Clado. Halle continued these investigations, and in collaboration with Albarran[7] published in 1888 the most complete bacteriological study of the urine which had appeared up to that period.

For the first time a very careful attempt was made to obtain the urine from the bladder under strictly aseptic precautions. The authors investigated fifty cases, and in forty-seven a bacillus was found. Fifteen times it appeared in pure culture. In the other cases it was associated with different species of cocci. Halle and Albarran laid little or no stress upon the cocci which they found and did not describe them. The bacillus they called "bacterie pyogênê," owing to its marked pus-producing power.

According to Melchior it was the same organism as that previously described by Halle and by Clado.

Albarran[8] followed up his researches, and in 1889 published a report of twenty-five cases of urinary infection (des urinaires), in all of which a bacteriological examination was made. All these cases were nephritics. Of the twenty-five cases examined he found the same "bacterie pyogênê," which he had described

with Halle the previous year, twenty-three times. Fifteen times the pyogenic bacterium was found in pure culture. Six times it was found associated with different species, namely : four times with a coccus, once with another bacillus, and once with the streptococcus pyogenes. In the two remaining cases the streptococcus pyogenes was found in pure culture. This is the first mention made of the discovery of a pure culture of a well known pus-producing coccus in the urine of cystitis.

In the next year, 1890, Albarran and Tuffier[9] published a joint report of further investigations into the relation of the bacterium pyogenes to infections of the bladder and other portions of the genito-urinary tract.

It is proper to mention at this point that in 1888, when Halle and Albarran first published their researches, the colon bacillus had only been known three years. Escherich had isolated it from the stools in 1885 and had fully described it, and it had been investigated in the principal laboratories, but its pathogenic qualities were entirely unknown and it was considered merely as a normal inhabitant of the large intestine. Its capacities as a ubiquitous pathogenic agent were only gradually understood.

The researches of Doyen[10] into the bacteriology of cystitis and pyelonephritis should now be referred to. His work was published in 1888 and 1889. He isolated and described three varieties of bacilli from the urine of pyelonephritis. He identified them as proteus zenkeri, proteus mirabilis and proteus vulgaris (Hauser). In a second publication[11] he described a long series of bacteria which he isolated in pure culture from the urine in cases of cystitis and pyelonephritis. He claimed to have isolated fourteen species—ten bacilli and four cocci.

Doyen's classification is rather complex, and to many well known species of organisms he has attached fanciful names. He describes three varities of cocci which he names micrococcus urinae major (probably streptococcus pyogenes); micrococcus urinae albus olearius (probably staphylococcus pyogenes albus); and micrococcus urinae flavus olearius (probably staphylococcus pyogenes aureus).

In 1889 appeared a very important document which serves as a sort of stepping stone between the early contemporary period and the late contemporary period of urinary bacteriology. This was a monograph by Rovsing[12], of Copenhagen. He examined

the urine recovered under strict antiseptic precautions from twenty-nine cases of cystitis. He found bacteria in every case, usually in pure culture, occasionally associations of two or three species.

He divided the bacteria which he found into two groups, pyogenic and non-pyogenic, according to whether or not they produced bladder suppuration. He also offered a classification of cystitis based upon his bacteriological investigations as follows: 1st, catarrhal cystitis; 2d, suppurative cystitis, comprising two subgroups: *a*, ammoniacal suppurative cystitis; *b*, acid and tubercular cystitis. In 1893 Rovsing somewhat modified his classification by stating that he had observed cases of acid cystitis due to streptococcus infection and which were non-tubercular.

The investigations of Krogius[13] in 1890 and Schnitzler[14] in 1908 and again in 1892 upon the etiology of acute cystitis are interesting, but inasmuch as they do not deal with chronic cystitis, nor with the presence of pus cocci in the urine they need only be mentioned.

In 1891 Morelle[15] published his investigations into the bacteriology of cystitis. He examined seventeen cases. In the large majority (thirteen cases) he identified a bacillus as the cause of the disease. In six instances, or nearly one-half, it existed in pure culture. He considered this bacillus as the same one which had been previously described by Clado, Albarran, Halle, Rovsing, Doyen, etc., under different names.

The most important thing which Morelle did, however, was to identify his organism with the colon bacillus of Escherich. The credit of doing this belongs to Morelle. In many of his cases Morelle found pyogenic cocci; twice staphylococcus pyogenes aureus, and five times streptococcus pyogenes.

The next investigator to mention the presence of pyogenic cocci in the urine of cystitis was Denys[16], whose work appeared in 1892. He examined the urine in twenty-five cases of cystitis and in seventeen found the colon bacillus, once associated with staphylococcus pyogenes aureus, and once with streptococcus pyogenes. Denys claimed that when the urine was alkaline he found staphylococcus pyogenes aureus constantly present.

It should be mentioned that in 1890, Lundstroem[17] isolated two varieties of cocci from the ammoniacal urine of alkaline cystitis in two cases. These organisms possessed the property of rapidly

decomposing urea. To one he gave the name of staphylococcus ureae liquefaciens and to the other staphylococcus ureae candidus.

The above résumé includes all the documents concerning the bacteriology of cystitis which were published prior to the year 1894. At this period the classical work of Melchior, of Copenhagen, appeared. It was written in Danish, but in 1895 a French translation by Halle[18] was published.

The monograph of Melchior marks the beginning of what may be styled the late contemporary period of the bacteriology of cystitis. Inasmuch as the object of this paper is to discuss the question of staphylococcus infection of the bladder, it will be unnecessary to recapitulate the work of Melchior, except as it bears upon the question of the etiological relation of staphylococcus to chronic inflammation of the bladder. Melchior made a bacteriological examination of the urine in thirty-five cases of cystitis, in all of which microorganisms were found. In twenty-eight cases certain organisms were found in pure culture. In five cases there were two species associated, and in the remaining two there were three species associated. Altogether nine different species of bacteria were found. The following short table gives the nine different species which he obtained, with the number of times found.

| | Found, times. | Pure culture, times. |
|---|---|---|
| Bacterium coli commune, . . . | 24 | 17 |
| Streptococcus pyogenes, . . . | 4 | 3 |
| Proteus (Hauser), . . . . . | 4 | 1 |
| Bacillus tuberculosis, . . . . | 3 | 2 |
| Diplococcus ureae liquefaciens, . | 3 | 2 |
| Staphylococcus ureae liquefaciens, | 3 | 1 |
| Streptococcus anthracoides, . . | 3 | 0 |
| Gonococcus, . . . . . | 1 | 1 |
| Bacillus typhi abdominalis, . . | 1 | 1 |

The findings of Melchior proved once again and for all the preponderant influence of the bacillus coli communis in the production of cystitis. It showed also the comparative infrequency of the pyogenic cocci in the same relation, for the streptococcus pyogenes, which was found next in frequency, was only encountered in four cases and the staphylococcus in three.

In all three cases in which Melchior found the staphylococcus

the urine was purulent and the reaction pronouncedly ammoniacal. The same was true with respect to the diplococcus which he found in three cases and which he believed to be a species not hitherto described.

In his opinion, however, an acid cystitis may be due, outside of the tubercle bacillus, to the bacillus coli communis, to the streptococcus pyogenes, the gonococcus and the typhoid bacillus. He apparently did not encounter a single case of cystitis with acid urine due to staphylococcus infection.

In 1895 Kastalskaja[19] reported bacteriological examination in twelve cases. She found streptococcus pyogenes associated with colon bacillus once and a so-called pseudo-staphylococcus pyogenes albus in one.

In 1899, Reach[20] examined fourteen cases and found staphylococcus pyogenes aureus twice, staphylococcus pyogenes albus three times and streptococcus pyogenes three times. Like most of his predecessors he found the bacterium coli in the larger number of cases; next, proteus vulgaris, and then in order, bacterium lactis aerogenes, staphylococcus pyogenes aureus and albus, and streptococcus pyogenes. Reach examined fifty-six cases of cystitis for urine reaction; twenty-one were alkaline, thirty-one acid and four neutral. Reach found the urine containing. staphylococci usually alkaline, those with streptococci, acid.

Calcar[21], of Amsterdam, examined twelve cases of chronic cystitis in males, associated with prostatic hypertrophy or urethral stricture, and found the colon bacillus in every case. Staphylococcus pyogenes albus was found associated in three cases and streptococcus pyogenes in one.

Parascandolo[22], of Naples, in 1900 published a report of bacteriological examinations of the urine in twenty-eight cases. He found streptococcus pyogenes in five cases, staphylococcus pyogenes albus in eight cases and staphylococcus pyogenes albus twice. The order of frequency in which the different pathogenic bacteria in chronic cystitis has been observed showed bacillus coli communis first, proteus vulgaris second, streptococcus pyogenes third, staphylococcus pyogenes aureus and albus fourth.

In the same year (1900) Tanago[23] examined twenty-three cases of chronic cystitis and found staphylococci nine times. The organism was usually found associated with other bacteria. The particular variety of staphylococcus is not mentioned.

In 1901 Brown[24] published an important contribution to the subject in the Johns Hopkins Hospital Bulletin. His work concerned both acute and chronic cystitis. In twenty-six acute cases he found staphylococcus pyogenes albus twice, staphylococcus aureus once. In thirty-one chronic cases he found as follows: 55.2 per cent. due to colon bacillus; 10.3 per cent. to staphylococcus pyogenes aureus; 6.92 per cent. to staphylococcus pyogenes albus; 13.8 per cent. to a gelatine liquefying staphylococcus; 6 per cent. to tubercle bacillus and 3.4 per cent. to proteus vulgaris.

Faltin[25] in 1902 reported bacteriological examinations of eighty-six cases of infections of the urinary organs, and found streptococci in forty-four cases. He apparently did not find staphylococci. In only forty cases was the bacillus coli found. He found a number of previously undescribed microorganisms, chiefly bacilli.

In 1903 Longfellow[26] reported a case of cystitis complicating cervical erosion and uterine displacement, in which were found streptococcus pyogenes, staphylococcus pyogenes aureus and albus and bacillus coli communis.

Of the above mentioned authors who have studied chronic cystitis from a bacteriological standpoint ten mention specifically the number of cases examined and the exact number in which staphylococci were found. The total number of cases reported by these ten investigators is 243. In this number staphylococci were found forty-one times, or in 16.9 per cent.

As to the origin of staphylococcus cystitis, it is natural to assume that in a certain number of cases the contamination comes from the urethra. Several investigators have subjected the urethral secretions to bacteriological examination, and, without entering too deeply into this phase of the subject, it might be well to mention a few of the most important results. Von Garowsky[27] examined the urethra in sixty-two cases and found microorganisms fifteen times, or in about 25 per cent. The remaining 75 per cent. were sterile. In the positive cases he isolated staphylococci nine times, streptococci three times and colon bacilli twice.

Savor[28] examined the urethral secretions bacteriologically in ninety-three cases and obtained positive results in fifty-nine. He found staphylococcus pyogenes albus six times, staphylococcus pyogenes aureus six times, streptococcus four times and bacillus coli fourteen times.

Schenck and Austerlitz[29], in their investigations upon urethral bacteria, found pathogenic microorganisms present in but 3.4 per cent. of their cases examined.

Piltz[30] examined the urethra and vulva in fifty gynecological cases and found pathogenic bacteria present in the urethra twenty-four times. In one hundred and eighty-nine of these cases staphylococcus pyogenes albus was found: staphylococcus pyogenes aureus once; streptococcus pyogenes once and colon bacillus six times. He found that during pregnancy and after delivery the organisms tend to increase.

Taussig[31], of St. Louis, in 1907, examined the urethral secretions in forty-five gynecological cases. Two of his patients were hospital cases and the remaining forty-three were dispensary cases. None of the patients had any disease of the urinary tract. In twenty-five dispensary cases 62 per cent. pathogenic organisms were found: staphylococcus pyogenes albus twenty-three times, staphylococcus pyogenes aureus once, streptococcus pyogenes twice, bacterium coli twice.

Of the five hospital cases four had pathogenic germs in the urethra, staphylococcus pyogenes albus three times, colon bacillus once. Basing the statement upon the examination of about five hundred cases made by Savor, Piltz and himself, Taussig concludes that in about 50 per cent. of women not confined to bed, the urethra contains pathogenic microorganisms of which staphylococcus pyogenes albus is most frequent.

Even granting these figures to express the exact truth, it is not entirely clear how staphylococci in the urethra can invade the bladder in the absence of previous catheterization or injury, nor why staphylococcus infection of the bladder should be comparatively uncommon although the pus organisms comprise so large a portion of the saprophytic flora of the lower genito-urinary passages.

It is more than likely, therefore, as has been pointed out by a number of recent writers, that the bladder infection in staphylococcus cystitis, as in colon cystitis, comes from the migration of the organisms from neighboring organs in a state of inflammation. So that chronic staphylococcus cystitis in women probably originates in the vast majority of cases from a coexisting perimetric inflammation.

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**Dr. Kinyoun** had little to add ; the paper was exhaustive. He would like to ask how many examinations had been made as to the bacteriology of the urine in the case and over what period of time. His experience had been that much variation may be met with in cystitis both in number and kind of bacteria. In chronic cystitis due to *bacillus coli communis* the organism is very persistent but variable in numbers. The treatment of cystitis is difficult ; he was surprised to hear that a solution of silver nitrate as weak as 1-5000 was effective in this case ; he himself would be disposed to use much stronger solutions.

**Dr. Hamilton** had conducted the bacteriologic study of the case; two examinations were made; that is to say, two series of experiments had been conducted. Throughout both series the same organism had persisted without variation; there was no *coli communis* present at any time, no gas formation, no liquefaction; litmus milk turned red after inoculation.

**Dr. A. F. A. King** said that from the report of the method pursued in making the study under discussion the differentiation of the particular organism responsible for a given condition was attended with great difficulty. After the identity of the infective bacterium has been determined, is not the treatment identical in all cases, and is there any necessity for such a study in ordinary practice? He recognized, of course, the interest and importance of such studies from a scientific standpoint.

**Dr. Littlepage** had recently treated two cases of *colon* cystitis, one case having a mixed infection with staphylococci. He had experienced difficulty in the treatment, but accidentally had a therapeutic hint. He had received a specimen of urine from one patient and, being unable to examine it at the time, had added some quinine to the fluid as a preservative; on microscopic examination the next morning he found that all the organisms were dead. He therefore irrigated the bladder in the two cases with a solution of quinine (1 to 400), and after a week the bacteria disappeared from the urine in the first case; in the second case, in which the quinine irrigations were used from the beginning, a cure was effected in ten days.

**Dr. Carr** said that in general the best results were obtained in the treatment of cystititis by using weak solutions. He congratulated Dr. Barton upon the result in his case. It is important to recognize the type of infection present in any case from a therapeutic standpoint; an organism growing best in an acid medium would suggest making the urine alkaline; one growing best in an alkaline medium would suggest rendering the urine acid. The staphylococcic infections are the most difficult to cure; these organisms are more tenacious than the colon group or the streptococci. He had found solutions of argyrol and ichthyol most efficacious, and they have the added advantage of being entirely innocuous.

**Dr. Roy** inquired what drug had the quality of rendering the urine acid; he had never been able to accomplish that end.

**Dr. Carr** replied that the administration of the mineral acids, if continued long enough, would turn the urine acid.

**Dr. Barton** said that the peculiar merit of urotropin, in addition to its antiseptic qualities, was its ability to render the urine acid and to keep it so. In reply to Dr. King, he said that the question as to the practical utility of bacteriologic studies in such cases as the one under discussion was pertinent; one advantage of such studies might lie in directing attention to a primary focus

of infection. The cystitis might be due, for example, to some parauterine infection; in the case reported, he had reason to believe the primary focus was an old salpingitis. If there should be a recurrence it might be well to remove the offending tube. The therapeutic uses of bacteriologic studies might be illustrated thus: a streptococcus cystitis would be uninfluenced by irrigations with argyrol solutions, but would respond to solutions of nitrate of silver.

As to the strength of solutions used in the treatment of his case, if a weak solution will do, there is no need of using stronger; he had, therefore, been happy to find a 1-5000 solution of silver nitrate effective.

## REVIEW OF SURGERY.*

By GEORGE TULLY VAUGHAN, M. D.,

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In looking over the field of surgery in search of important advances which have been made during the last year or so, I find much that is worthy of comment.

*Anesthetics.*—Much work has been done with local anesthetics —cocaine, eucaine, stovaine, alypin, etc.—injected locally into the nerves or into the spinal canal, also with nitrous oxide and ethyl bromide, and while many of these have their uses, there appears to be no probability in the near future of displacing our old friends ether and chloroform as all around anesthetics in the large majority of cases. The hyoscine-scopolamine-morphine method of producing anesthesia is probably doomed to complete extinction at an early date, as its action is due to the large quantity of morphine given.

*Brain and Spinal Cord.*—Good work continues to be done on the brain, spinal cord and nerves, but, aside from some improvement in technic, no special advances have marked the last year.

*Abdominal Surgery.*—Almost the same may be said about abdominal surgery in spite of the enormous amount of work which has been done in this field. One operation may be mentioned—that of Herzen for incorrigible stricture of the esophagus. It consists in bringing up a loop of small intestine through an opening in the mesocolon and subcutaneous passage over the chest

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into the neck. The lower end of this tube is then anastomosed with the stomach, and finally the upper end is united to the esophagus above the stricture. Two to six weeks may be permitted to elapse between the first and second, and the second and third steps of the operation.

*Genito-Urinary Surgery.*—In genito-urinary surgery the advances have not been notable. It still requires an indefinitely long period of time to cure gonorrhea. Operations are done by the hundred on the kidneys, ureters, bladder and urethra, but the question as to the best method of disposal of the ureters, after excision of the bladder, is still unsettled and the controversy over suprapubic *versus* perineal prostatectomy rages with unabated vigor.

*Cancer.*—In the pathology and treatment of cancer, in spite of the work which has been carried on with serums and animal experiments, nothing of importance has developed. The main dependence—in fact the only hope—is still in a very early diagnosis and a no less early and very radical operation for its removal.

*Fractures and Dislocations.*—The continued use of the Roentgen-ray has added much to our knowledge of the pathology and the best methods of treatment of fractures and dislocations. As a consequence operations are becoming more and more frequent in order to effect reduction in those cases which have resisted less radical methods.

*Heart and Bloodvessels.*—The greatest advances have been made in the surgery of the heart and bloodvessels. Sauerbruch's cabinet is undoubtedly a valuable aid in operations in the thoracic cavity which would cause collapse of the lung.

The heart itself has been sutured in more than 150 patients for wounds of various kinds during the last 12 years, with 98 deaths and 52 recoveries, a mortality of 65 per cent. Separating the stab and other wounds from the gunshot wounds, there were 134 cases of the former with 89 deaths and 45 recoveries, mortality of 66 per cent., and 16 gunshot wounds with 9 deaths and 7 recoveries, mortality 56 per cent. In other words, this list shows that gunshot wounds have a mortality 10 per cent. less than other wounds of the heart.

*Excision of the Pericardium.*—Parlavecchio having observed that a number of cases had been reported of congenital absence of the pericardium in most of which there were no symp-

toms, the condition having been found post mortem, made experiments on 10 dogs in order to determine the possibility of its performance as a therapeutic measure. He concludes that it is an operation comparable with splenectomy or partial thyroidectomy, and offers good prospects of success in malignant disease or in chronic pericarditis. One phrenic nerve can be divided with impunity but not both. Some of the dogs were in good health five and six months after operation.

*Opening the Pulmonary Artery for the Removal of Thrombi.*—This operation has been done twice at the Leipzig clinic, first by Sievers, the patient dying 15 hours later, and second by F. Trendelenburg, who gives a graphic description of his case in the *Deutsche Medicinische Wochenschrift* of July 2, 1908.

The patient was a man 45 years old who probably had locomotor ataxia and was under treatment for fracture of the left femur, caused by pulling on his boot. About three weeks after the fracture, while wearing a plaster cast, he was taken with chilly sensations, and fifteen minutes later he suddenly became breathless, complained of blindness, was restless, anxious, and presented a cyanotic, shrunken appearance. The respirations were deep and hurried, pulse weak, heart sounds soft and free from murmurs. He was taken at once to the operating room, and improved—the pulse becoming stronger and the breathing more quiet, so that the operation was deferred, when, suddenly, he became worse, and great anxiety, dyspnoea, small, irregular pulse, though the mind was clear, indicated impending death. Under chloroform an incision was made along the left border of the sternum, from the upper border of the first rib downward to that of the third rib. A horizontal incision was then made from the first incision along the left second rib, and the two triangular flaps thus made were turned back. The second rib was resected near the sternum, the pleura being opened, and the pericardium was opened at the upper border of the third rib. The aorta and pulmonary artery were held forward by means of a large curved sound until a rubber tube could be passed around them. These vessels then ceased to pulsate while the heart contracted weakly and irregularly, and just then breathing ceased and there was not time to separate the pericardium from the pulmonary artery; so the rubber tube was drawn up to control the pulmonary artery and the latter was quickly opened with the point of the knife.

A polypus forceps was introduced, and a thrombus 34 centimeters long (13 inches) was removed. The forceps was again introduced and 3 smaller thrombi were removed. Blood did not flow, so the wound in the artery was closed with forceps and the rubber tube was relaxed. Artificial respiration was resorted to and soon had the respirations and pulsations going again.

Some trouble was met with in suturing the wound in the pulmonary artery on account of its strong pulsations, but this was overcome by drawing the artery forward by means of the rubber tube until a suture could be passed and tied, then the tube was relaxed and the artery permitted to pulsate for a while, this procedure being repeated until the suture was completed, when the tube was removed and the external wound closed. His general condition was fairly good until next morning, when he gradually became worse with dyspnoea, weak and irregular pulse, and death occurred 37 hours after the operation. The necropsy showed the wound in the artery well closed. In the left branch was a large thrombus and in a small twig of the right branch was a small plug. Thrombi were found in the deep veins of the right leg, and the aorta showed sclerotic changes.

*Anastomosis of Bloodvessels and Transplantation of Organs.*—Wonderful feats have been accomplished by Carrel and Guthrie and others in the anastomosis of bloodvessels; in the transplantation of a segment of one vessel—an artery or vein—to take the place of a corresponding segment removed; and in the transplantation of entire organs. In a number of instances in dogs and cats, the kidneys have been transplanted from one animal to another and have continued to functionate for months afterwards. The kidneys may be transplanted *en masse* by extirpating from one animal both kidneys, their vessels and the corresponding segments of the aorta and vena cava, their nerves and nerve ganglia, their ureters and the corresponding part of the bladder, and placing these organs in the abdominal cavity of a second animal, prepared by the removal of its corresponding organs, and suturing the aorta, vena cava and segment of bladder into their proper places. Carrel says that in every case the re-establishment of the renal function was observed. Some of the animals lived from fifteen to twenty-five days apparently in good health. Simple transplantation and replantation of the kidneys consist in removing a kidney by cutting the renal vessels

and ureter and replacing it in its owner or transplanting it to another animal. Carrel performed double nephrectomy, with replantation of one kidney, in five dogs, and states that the results of the operation are excellent ; the excretion of urine remained normal as long as no ureteral complication occurred, and one dog was in perfect health four months after the operation. In two dogs a unilateral nephrectomy was done and the extirpated kidney was replaced by the kidney from another dog. The two animals were in good health one year later, but as a normal kidney had been left, no definite conclusions could be drawn as to the function of the transplanted kidney.

*Transplantation of Limbs.*—In a dog the hind leg amputated just below the knee was replaced by another leg just amputated from another dog. Good union took place, but the animal died of pneumonia on the twenty-second day after operation.

*Transplantation of Heads.*—Guthrie writes : "In addition I have transplanted dogs' heads with preservation of cerebral and bulbar function. Even in a case in which the circulation was interrupted for twenty-nine minutes good return of function was observed in the transplanted head."

*Transplantation of Joints in the Human Patient.*—The work of Lexer of Koenigsberg in the transplantation of joints deserves especial mention. In one patient healthy cartilage from the patellar surface of the femur was transplanted to the humerus and ulna of an anchylosed elbow joint properly prepared for its reception. Perfect healing followed, and motion was increasing when the patient left the clinic in the fifth week after operation. In two patients the entire knee-joint-bones, cartilages and ligaments, except the patella, were transplanted. In one the anchylosed knee, except the patella, was excised, leaving a gap of three finger breadths between the ends of the bones. A corresponding knee joint, except the patella, was taken from a recently amputated limb, sawed to fit the gap, put in place and fastened with nails and sutures. In another patient with anchylosis of a tuberculous knee the knee joint was removed and replaced by a sound knee in a similar way. In both patients good union followed, and fairly good motion at the end of five months and nine weeks, respectively. In another patient the lower half of the knee joint and upper third of the tibia, removed on account of sarcoma, were successfully replaced by corresponding parts from an amputated

limb. Five months later the result was excellent, in spite of the fact that the right tibia had been made to take the place of the left.

In another patient the upper two-thirds of the left humerus, removed for sarcoma, were successfully replaced by a part of a femur—no fresh humerus being available—one condyle of which was trimmed to correspond to the head of the humerus.

In still another patient the entire proximal phalanx of the fourth finger, removed for enchondroma, was successfully replaced with the proximal phalanx of the second toe of a freshly amputated foot, although the bone from the foot was a little too short.

We may also mention Czerny's experience in successfully transplanting a lipoma of suitable size in the place of an amputated breast.

In closing I realize that many interesting and important advances in surgery have been omitted from this review; time did not permit consideration of all, and I have selected those which I believed to be of the greatest interest and importance.

**Dr. Balloch** said the subject of local anesthesia is important and its possibilities are great. He spoke of a colleague who had amputated at the hip joint under local anesthesia with success; the patient was a woman 70 years old; the leg was removed for senile gangrene. Dr. Vaughan had done wisely in laying stress upon the work of Carrel and Guthrie; there can be no doubt that their work in the transplantation of organs and the suturing of arteries and veins marks the beginning of a new era in surgery. The reports of the transplantation of joints and bones sound fantastic, but they record the serious efforts of serious men, and are to be given credit for heralding the most important advances of surgery for the past few years. The operation described for the transplantation of the intestine to the subcutaneous tissue of the chest and its adaptation as an artificial esophagus could hardly be classed as justifiable surgery. Surgery for pulmonary thrombosis will not, in his opinion, find a large field of usefulness; death takes place too quickly after the event for surgical intervention to be possible.

**Dr. E. L. Morgan** called attention to a satirical writing by one of the wits of English literature, Swift, perhaps, in which the transplantation of the brains of two individuals was pictured. That many a true word is spoken in jest was further emphasized by Dr. Vaughan's mention of the transplantation of the head of one dog to the trunk of another.

# PARTIAL MYXEDEMA.*

(Abstract.)

By JOHN BENJAMIN NICHOLS, M. D.,

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Partial myxedema is a disorder caused by partial insufficiency of the thyroid gland, as compared with the clinical complex constituting complete myxedema, caused by total abolition of thyroid function.

In the partial, as in the complete, forms of myxedema spontaneous adult, infantile and postoperative varieties occur.

The adult form occurs most frequently in females and is most apt to develop at from thirty to fifty years of age. The cardinal symptoms are asthenia, pains, subnormal metabolism, obesity, thermic disturbances ("hypothermia"—subnormal temperature, coldness, sensitiveness to cold), infiltrations of the skin, trophic changes in the skin, nails and hair, hemorrhagic tendencies, dental decay, anorexia, hypochlorhydria, constipation, altered voice, dyspnea. Disturbances of mentality may occur, but are far less marked than in the complete cases.

In the infantile cases, "myxedematous infantilism," with the attenuated symptoms of myxedema or cretinism, are conjoined arrest or retardation of physical and mental development.

The treatment is specific and highly efficient, consisting in the administration of preparations of the thyroid gland, which, however, requires caution. The results of treatment are diagnostic.

The case of a woman was reported in detail, in which the administration of thyroid brought about a reduction in weight from 214 to 149 pounds, together with abatement, in great degree, of the hypothyroid symptoms.

**Dr. J. D. Morgan** said that the first case of the kind that he had seen was in London, in 1886, at St. Thomas' Hospital. He had gone to London with a letter of introduction from Dr. John S. Billings to Dr. Wm. Ord. In accompanying Dr. Ord through the wards of St. Thomas' he was shown a large woman, past middle age, sitting close to the stove, the season then being early autumn. This was a most impressive case, though at the time he had no knowledge of the disease; his recollection was that she presented just the train of symptoms depicted by Dr. Nichols, and Dr. Ord

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demonstrated that she had no thyroid gland. Since then Dr. Morgan has seen two cases of partial myxedema, one in his own practice and one with another physician. His own case was that of a white woman, 55 years old, who had borne many children and had been subjected in an unusual degree to the stresses of life. She became ill with ill-defined symptoms of nutritive disorder, the skin became dry and harsh, the hair showed evidence of atrophic changes, and other integumentary symptoms were present. She greatly improved under thyroid extract therapy.

**Dr. Williams** said that the subject of the paper touches very closely the student of nervous and mental diseases ; the study of hypothyroidism forges one more link connecting physical disease with the so-called diseases of the mind. Cretinism is recognized as a physical state due to an insufficiency of thyroid gland secretion, but it is also to some degree a mental disease. Other investigations into diseases of the ductless glands discover intimate relations with certain nervous and mental disorders ; for example, many cases of general paralysis are found to be associated with partial myxedema and other defects of the thyroid gland. As to the pathogenesis, it is known that most cases of imbecility are due to congenital syphilis ; might not the tendency of syphilis to cause fibrous degeneration be an explanation of the deficiency of thyroid development. The marked neurasthenic symptoms presented by Dr. Nichols' patient constitute strong evidence that neurasthenia is not a mental, but a physical disorder.

**Dr. P. C. Hunt** had lately seen a case of insanity, the patient being also myxedematous. From a study of the subject he found that while myxedema is not frequent among the insane, mental disorders are very frequent among sufferers from myxedema.

**Dr. Hardin** spoke of an interesting case of partial myxedema which had occurred in a lady whom he had long known unprofessionally ; in middle life she had married and left the city. A year or two ago she consulted him and was found to be suffering from partial myxedema ; he also learned for the first time that she had had epileptic attacks for twelve years. She and her people had been patients of Dr. Osler's, and she refused to take thyroid extract without his consent ; it was therefore necessary to delay specific treatment until Dr. Osler could come over from England and consent to thyroid therapy. Since she has been under the influence of thyroid medication there have been no attacks of *grand mal*, though seizures of *petit mal* occasionally persist.

**Dr. Fremont-Smith** said that hypersecretion has been written of extensively, but that little has been said of hyposecretion ; Dr. Nichols' paper was, therefore, timely, and he was to be thanked for his choice of subject. Partial cases, whether on one side of the normal or the other, are very easy to overlook. Dr. Smith had recently observed two cases in point, one of hypersecretion,

the other of hyposecretion ; a young lady, 20 years old, had become neurasthenic, sleepless and thin ; the pulse rate was much increased, being 120 per minute lying down, 130 sitting and 140 walking about ; the thyroid was somewhat enlarged. He had advised rest, freedom from care, etc., but she and her people declined to take his advice and she passed into the hands of another physician. He saw her again after a year, and observed that her pulse rate was still much above the normal. The second case was that of a young man who for an extreme degree of alopecia had "suffered much at the hands of many physicians." He was practically wholly bald ; his skin showed a slight yellowish tinge, and there was some puffiness about the eyebrows. Under thyroid therapy he improved very decidedly and obtained quite a growth of hair.

An interesting case was that of a pregnant woman who was exposed to mumps. The thyroid gland became enlarged and tender, and so remained for about two weeks ; a few days later all the swelling had disappeared. He had been unable to find any account of like cases in the literature.

**Dr. Reyburn** said that the excellent paper had been of great interest to him ; he had now under treatment a patient 20 years old, but infantile in development and mentality. Many of the symptoms in this case were just such as Dr. Nichols had described. The improvement which has taken place since thyroid therapy was instituted is wonderful. It should not be overlooked, however, that thyroid extract is a powerful agent and that care must be exercised in using it.

**Dr. Isabel Haslup Lamb** had been interested in the fact that there was a family history of tuberculosis in Dr. Nichols' case, as there had been in the case of cretinism reported by her some months ago. She inquired if Dr. Nichols had noticed any faulty development of bones in his case. In the past few years she had noticed several cases in which spinal curvature and partial exophthalmic goiter coexisted, and one in which partial Graves' disease was associated with achondroplasia.

**Dr. Acker** said that the paper was important because it called attention to the possibility of latent or obscure myxedema, conditions of considerable gravity, not easily recognized, but susceptible of cure. The infantile cases, true cretinism, are easy to recognize and will lead no one astray.

**Dr. Nichols** said that one of the marked symptoms of complete myxedema is mental deficiency ; in the *formes frustes*, however, all the physical signs may be present, with little or no mental change. In his case, the neurasthenia had abundant causative foundation aside from the myxedema. Brissaud has advanced the idea that in myxedema mental deficiency is due to defects in the parathyroid bodies, while the physical changes are due to de-

fects of the thyroid gland; this is, however, merely an unsupported opinion.

Dr. Nichols had not noticed any faulty bone development in his patient; bone tuberculosis, however, is apt to occur in myxedematous individuals.

## PRESIDENTIAL ADDRESS.

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, DECEMBER 16, 1908.

BY HENRY D. FRY, M. D., SC. D.

Mr. Vice President, Ladies and Gentlemen: On February 16, 1894, the Medical Society of the District of Columbia celebrated its 75th anniversary; *ergo* it is now in its last year of octogenarianhood. Since its inception, nearly 1,000 names have been enrolled upon its roster; over half of these have been removed by death or resignation, leaving us a roll call of 450. In January, 1894, the late Dr. S. C. Busey reported an active membership of 214; therefore, during the last fourteen years the accessions have been far in advance of the losses.

A sad duty always, in an address of this character, is to chronicle the loss by death of members and co-laborers. The year 1908 has taken from our midst seven of our number: Drs. Hoadley, McLain, Tiefenthaler, Wilson, Donohue, Rand and W. E. Rogers. The death rate of the members of this Society is high. I quote again from Dr. Busey's report: "Of the 214 members alive in January, 1894, but three had passed the age of 70 and but 13 had reached the age of 65. Of the dead during the seventy-five years of existence of the Medical Society of the District of Columbia, but 28 had passed the age of three score and ten." In June, 1882, a resolution passed by the Society advocated the establishment of a general hospital in Washington, and the memorial to that effect was signed by 85 members of this Society. Although many of the signers were young and middle aged men, nearly 50 per cent. have died in the twenty-five years that have intervened.

The attendance of members at the meetings of the Society during the past year has been from 15 to 25 per cent., whereas it

ought to be from 40 to 50 per cent. Professional and social engagements may sometimes prevent attendance, but many members are conspicuous by their absence from all meetings. The reverse side of the picture is a canvass much more to my liking, and shows busy professional men, members of this Society, rarely away from its meetings.

The work of the Society during the year has been highly satisfactory. The essays, reviews and papers have shown careful preparation; interesting pathological specimens have been presented, and the discussions have been creditable.

You have made the duties of your presiding officer an easy labor of love, and while thanking you for your consideration, I wish to express my appreciation and gratitude for the honor you have bestowed upon me. My final obligation of office is the annual penalty you have to pay for the services of a President, namely, to sit and listen to his address.

## RANDOM THOUGHTS ABOUT LIFE AND DOCTORS.

I am optimistic tonight, otherwise my title would be Random Thoughts about Disease and Doctors; or Death and Doctors.

The common aim of all workers in our noble profession is the relief of suffering; the prolongation of life; the prevention of disease; and, when the human frame is racked with illness, the saving of life. Pain, in itself, calls forth our sympathy and aid. The performance of healthy function is unaccompanied by pain; indeed, it should often be manifested by pleasure.

If the system be deprived of food for an undue time, the starved tissues cry out for nourishment. The seat of rebellion is located in the region of the stomach, and it is manifested by a pain which is described as "gnawing." To eat, under these circumstances, is a pleasure. The process of healthy digestion after a full meal, is a pleasure.

Take the human being who dwells in the city out of his environment, remove him from his badly ventilated office or dwelling and place him in the country; he inflates his lungs with pure air —it is a pleasure to breathe.

The deprivation of water from the human system causes suffering. To drink relieves the desire and gives pleasure. To realize this in its best light one should, in thought at least, accompany

the Indian, the primitive man, or the hunter in his tramp through the native woods. I pity you doctors who have not in your make-up some love of nature, and who do not know the pleasure of tramping; the pleasure of feeling tired; to eat when hungry; and when thirsty, the pleasure of drinking the cool water that runs through shady nooks. You drink, too, without fear of the colon or typhoid bacillus. Civilization brought abuses. Accumulation of wealth permitted men to lead indolent lives, and the healthy appetite was replaced by an artificial one, procured by the use of condiments, spices and fancy cooking. Man became dissatisfied with water as a drink. He must have something to give him more pleasure than simply the gratification of healthy thirst. With the substitution of wine the pleasure of drinking was no longer limited to the flow of liquid down the throat; it fired the brain; it produced pleasurable sensations unknown to the members of this Society, and as civilization advanced the demand arose for something stronger than wine, for something to give new sensations of pleasure.

Simply to live, if we live the simple life, is pleasure to the healthy organism; transgress the laws of that life, and pain is the danger signal; neglect the signal, and disease follows.

"Earth might become a joyous place, would man but reverence Nature's law."

Besides the discomforts of health there is the pain of disease. Pain has been studied, and whole books have been written about it. It is characterized as cutting, smarting, screwing, boring, stabbing, shooting, darting, sharp, dull, gnawing, wearing, teasing, tearing, dragging, bearing down, etc. These terms are employed in an effort to convey to another's mind an idea of the sensation felt by the sufferer. I have a patient who always attempts to describe, not only the character of her pain, but its size, shape, and even its color.

Pain is a guardian of health, inasmuch as it calls attention to disease. When the eye is affected, the painful sensation produced by light upon the organ calls for the darkened room. The danger of rheumatic fever is endocarditis; painful joints keep the patient quiet in bed and diminish the risk of the complication. Movement increases pain because an inflamed part needs rest. In pleurisy or intercostal neuralgia, abdominal breathing is substituted for thoracic; and in peritonitis, the reverse is the case.

The location of pain usually indicates the part affected. Exceptions to the rule may deceive the inexperienced, as when the pain of hepatic trouble is referred to the right shoulder, or that of hip-joint disease to the corresponding knee. The pain of diaphragmatic pleurisy on the right side may closely simulate the pain of appendicitis.

As I said in the beginning, one aim of our professional calling is to relieve pain. The best way to do that is to remove the cause. Cure the patient; he is well and his pain is gone. But we meet with cases in which the acute pain demands relief before the cure can be effected. Here we must relieve suffering by the use of some drug that will temporarily deaden the nerve centers. Opium is the drug employed more frequently than others, and the hypodermatic injection of morphia gives the most signal relief. Physicians, as a rule, recognize the danger of relieving pain by opiates. The pain is allayed, the patient gets well, but his future life may be wrecked by contracting the habit. When suffering from an incurable disease, as cancer, the drug may be employed to relieve pain until death ends the scene ; but its administration must be guarded when the indication is to relieve the suffering accompanying a curable disease. A sensible law, made to shield the public from indulgence in the drug habit, prohibits the druggist from renewing prescriptions which contain opium, chloral, cocaine, etc. In spite of all the precautions exercised by the doctor he will sometimes cause the downfall of a fellow being. His duty will compel him to relieve pain and he will employ his hypodermic syringe for the purpose. He cannot give moral strength of character to his patient, who may afterward seek voluntarily the pleasure he experienced from the drug that had been legitimately employed to relieve his pain when he was sick.

## THE PROLONGATION OF LIFE.

The prolongation of life is the second aim of our professional work. Man is his own worst enemy. Imprudence, and over indulgence in food and drink ; the abuse of alcohol and tobacco ; late hours ; close application to business pursuits ; a life with little exercise and fresh air—all or some of these enter into the individual lives of modern men. The Pure Food Law does not give adequate protection as to quality ; too much food is eaten, which is often badly prepared, and to stimulate a weakened digestion it

is over seasoned with spices and condiments. Many professional and business men pass from twenty to twenty-two hours out of every twenty-four indoors. The competition of business life brings worries and anxieties that keep the nervous system in a state of high tension. The lack of fresh air and exercise retards metabolism and chokes the emunctories. "A man is as old as his arteries;" the early and too common occurrence of arterio-sclerosis is evidence of the sins of omission and commission in the mode of living. These errors are usually the result of carelessness and ignorance, and it is our duty to teach the hygiene of life. A chain is no stronger than its weakest link. In individual cases we must look for that weak link, and by correcting the errors of living, strengthen the part and postpone the time when the break will occur.

"It will be difficult to find anywhere recorded an instance wherein constitutional defects, aggravated by unwise habits of life, threatened a more untimely death" than was the case with Louis Cornaro, styled Venetian Centenarian, of the 15th century; and if he, "with a constitution naturally weak and apparently ruined at the age of forty, could attain such results, who will presume to set a limit to the possibilities of longevity for the human family, after consecutive generations have faithfully observed Nature's wise laws?" ("The Art of Living Long," by Louis Cornaro.) This truly wonderful man was born in Venice in 1464. Being deprived of rights and privileges that were his by inheritance, he determined to make for himself a name more illustrious than merely noble, and set about securing to himself perfect health, which up to his fortieth year he did not enjoy, owing to a very delicate constitution, a choleric disposition and careless habits, which developed into those of intemperance. He realized that Nature does not deny us the power of living long, but man, by his own folly of excess, condemns himself to an early grave. He seemed tottering on the brink of extinction, when by an heroic effort, he pulled up and saved himself. He made his life as temperate and orderly as it had previously been intemperate and disorderly, and became a living example of the law which ordains that contrary ways of living must of necessity produce contrary effects. He proved the time-honored proverb that "whatever tastes good will nourish and strengthen" to be a fallacy of those sensually inclined, and set himself the task of

finding out just what food and drink was best suited to the needs of his impaired and abused metabolism. To those, and those only, he clung with a pertinacity that insured longevity, but an abbreviated *menu*. Early in his struggle for health he learned that "not to satiate one's self with food is the science of health," and he ever left the table feeling like Oliver Twist. His unfailing axiom became: take only the quantity your stomach can easily digest and only the kinds that agree with it; guard against great heat and cold, extreme fatigue, or excess of any nature; get your accustomed *quantum* of sleep; avoid poorly ventilated places. You will readily accustom yourself to the regimen, for in a being endowed with normal intelligence, the desire of life and health possesses greater weight than the mere pleasure of doing things which are known to be hurtful.

At the age of 83, after more than 40 years of perfect health, Cornaro wrote the first of the four discourses which constitute his famous treatise, "The Temperate Life." The second discourse was written at the age of 86; the third at 91, and the last at 95. He died at the advanced age of 104.

## THE PREVENTION AND CURE OF DISEASE.

The aim of modern medicine has been directed largely toward the prevention of disease. The interest of the public has been aroused, and crusades have been inaugurated on extensive lines. The erection of sanitary dwelling houses for the lower classes, and the fight against tuberculosis are two important subjects which are attracting much attention from the laity. The Government is not lacking in interest in the fight to protect the people. Quarantine laws have been enacted for a long time to prevent the entry into our ports of vessels carrying contagious diseases. More recently laws have been enforced against selling impure food and the investigators of the Agricultural Department in that line have done much creditable work. The importance of fresh air, good milk and water, is realized by every community. The gospel of cleanliness is preached and health authorities are accomplishing much to prevent the spread of disease. The laws requiring the report of contagious diseases and the isolation of the sick are important steps in advance.

A promising field for the investigation of scientists is in the discovery of sera to prevent disease. Success with diphtheria

and tetanus antitoxin encourages the hope that all zymotic diseases will be prevented by the use of immunizing sera.

Experiments have been made here and abroad for the purpose of producing immunity from typhoid fever by inoculation. A special Medical Board was called by the War Department to consider the advisability of immunizing the regular army against the ravages of typhoid fever. After due investigation, the Board expressed its conviction regarding the usefulness and harmlessness of antityphoid vaccination, and recommended that voluntary inoculation be employed in the army as a means of diminishing the death rate of typhoid fever. The severe endemic of typhoid that attacked the troops at Camp Alger during the recent Spanish War is still fresh in our minds. The same experience was encountered in detention camps located throughout various sections of this country ; sickness and death in camp made the danger greater than in battle.

The result of the fight against disease is represented not only by the saving of life, but by diminishing sickness. Think what that means ! It is easy to realize the loss sustained by death, but not that by sickness. In counting up the cost of disease one overlooks the hours of anxiety and nervous strain suffered by relatives and friends, and thinks only of the dollars. The annual cost in money is represented by millions of dollars ; dollars expended and dollars lost by the inability of the wage earner to pursue his calling. An item of expenditure which is of great personal interest to the doctor is the number of dollars which come his way in payment for professional services. It represents his living. Fight against disease means loss to him financially in proportion to the success he attains in preventing disease. It is professional suicide. Humanity appeals to the doctor, and commercialism is put aside. He enters the fight, and no prouder moment comes to him than when he feels that he has been an agent in the prevention of sickness.

A doctor not only fights to enforce the laws of hygiene and sanitation ; he fights men and microbes. He is antagonized in his work by men, or rather by cranks, who denounce legitimate medicine and proclaim the virtues of Christian Science, and various pathies. Here is one who does not believe in the efficacy of vaccination ; there is another who decries the use of antitoxins, and finally there is the hysterical, sentimental class, who oppose

vivisection. Nine out of ten anti-vivisectionists are densely ignorant on the subject. They are misled by the horrible tales of cruelty that are told to them. A prominent New York daily newspaper started the crusade against vivisection for financial gain, and spread its pernicious doctrines far and wide. Societies have been formed, lectures given, and strenuous efforts have been made to secure legislation against it. The best answer to these misguided enthusiasts is to put before them the success of the investigations of Flexner. The injection of a serum in the treatment of cerebro-spinal meningitis has reduced the mortality of that disease from 75 to 25 per cent., and has removed the horrible sequelae of the disease from the victims who recover. This discovery will save thousands of human lives annually, and was obtained at a sacrifice of a few monkeys. Recently, righteous anger was aroused in the breast of Mrs. Caroline Earl White, of Philadelphia, because inoculations against typhoid fever were made in the Quaker City. Mrs. Caroline Earl White is corresponding secretary of the American Anti-Vivisection Society, and is also actively connected with the Women's Pennsylvania Society for the Prevention of Cruelty to Animals. Mrs. White also expressed surprise and indignation at the report that the Army might be inoculated against typhoid fever and said: "It is another instance of such dangerous medical 'fads' gaining ground." Without authority she makes the statement: "There is a great mistake in saying that the serum treatment is very valuable, when we know, from the official returns, that the natives of India, where the disease has raged for years, are dying at the rate of a hundred a month, in spite of the use of serum. The treatment, has, in fact, proved a perfect failure." No evidence has been brought forward that the natives of India have ever been inoculated with the typhoid serum.

Another enemy the doctor has to fight is the skeptic. He believes in neither doctors nor medicines, and he never loses an opportunity to express his opinion of both. He is usually an eccentric man, bright mentally, and well physically, so that he feels it safe to indulge in defiance.

Erasmus was one of these sceptics, and in 1518, he wrote (See Life and Letters of Erasmus, page 225) this account of his sickness and experience with doctors: "An ulcer broke out in the night; and I was easier. I send for a surgeon. He finds another

on my back ; glands swollen and boils forming all over me. He tells Theodorie's servant that I have the plague, and that he will not come near me again. Theodorie brings the message. I don't believe it. I send for a Jew doctor, who wishes his body was sound as mine. The surgeon persists that it is the plague, and so does his father. I call in the best physician in the town, who says that he would have no objection to sleep with me. The Hebrew holds to his opinion. Another fellow makes a long face at the ulcer. I give him a gold crown, and tell him to come again the next day, which he refuses to do. I send doctors to the devil, commend myself to Christ, and am well in three days."

Fierce war has been waged against microbes for thirty years ; first the antiseptic period and now the aseptic. Victory is not complete, but the result is witnessed by the fact that we now rarely have epidemics of communicable diseases. Malignant types of zymotic disease are less common. Severe forms of surgical and puerperal sepsis are rare. Rigid aseptic technique is the rule in all surgical work. Even the careless surgeon secures creditable results now-a-days, because his patient is protected from his carelessness as well as from germs by the technique of internes and trained nurses in all modern hospitals. Instruments, sponges, ligatures, dressings, etc., were formerly prepared by the surgeon ; now they are furnished to him, and he must himself conform to the rules of aseptic technique or he will meet severe criticism. Even the laity recognize that the best surgical results are obtained today in hospitals, and for that reason the prejudice against such institutions is getting less and less.

The difference between the results obtained in hospital and home work is even more strikingly demonstrated in obstetrical than in surgical practice. The morbidity and mortality of the lying-in room are greater than they ought to be in private practice. Semmelweiss demonstrated the cause of puerperal infection sixty years ago, and pointed out the way to prevent it. Time has demonstrated the truth of his discovery, and it is recognized that death from puerperal infection is preventable. Carelessness and neglect of the rules of aseptic work in private obstetric practice are responsible for invalidism and sacrifice of life. The President's address, at the last meeting of the American Association of Obstetricians and Gynecologists, held in Baltimore last September, was entitled "Solving the Problem of Obstetrics."

Speaking on this subject he said: "There has been no improvement in the maternal and fetal mortality and morbidity of midwifery, except in hospital clinics and in maternities, for the last twenty years." Quoting Leopold, he said: "Six thousand deaths occurred from puerperal causes in the German Empire in the past year."

"These figures follow immediately the mortality rate of tuberculosis, and the war against such a mortality should be carried on much more energetically than the war against smallpox and cholera."

In closing this address, already long, I will speak of a thought that has often come to me regarding the practice of obstetrics. The advance of science has made necessary the development of specialism. The ramifications of knowledge have split up the solidarity of medicine, and have done away with the old family doctor. Special parts of the anatomy and special organs have specialists to look after them. There are general surgeons and special surgeons; doctors for men and doctors for women; doctors for grown persons and doctors for children. Classifications are also made according to the nature of diseases. Specialism has developed along every conceivable line. Results prove the wisdom of such a movement, and scientific attainment has reached the highest standard. All branches of the practice of medicine and surgery have benefitted except one, and as Ayres of New York expresses it "obstetrics is the Cinderella of her sister sciences." No line of medical work is so neglected and badly practiced as that of obstetrics, and it is only in the largest centers of population that one can find a few men who practice obstetrics as a specialty. The reason is obvious. The work is exacting and arduous, involving the loss of rest at night, and the compensation is inadequate.

Modern obstetrics is developing mainly along surgical lines, and a competent obstetrician is also a competent surgeon. The attractions of abdominal surgery finally entice him into the paths of the more lucrative and spectacular field; he gives up obstetrics and becomes a surgeon. There is another important factor which prevents the development of specialism in obstetric practice. The family doctor does not encourage it. As a rule he takes care of his obstetric patients and attempts to handle all cases, simple and complicated. Serious complications occurring in any other branch

of his family practice lead him to seek the aid of a specialist, but when brought face to face with difficult conditions here, he attempts to meet them unaided. One need not go so far as to indulge in the millennial idea that obstetrics will be an art practiced only by specialists; every community should have one or more men who devote themselves to this line of work, men whose superiority in obstetric practice and surgery is recognized, and to whom the general practitioner will refer complicated cases. I will close by making a plea for closer relations between the general practitioner and the obstetrician.

## THE EVILS OF HIGH BOARD FENCES IN RELATION TO CLEAN BACK YARDS.*

By WADE H. ATKINSON, M. D.,

Washington, D. C.

In this day of reform it might not be amiss to introduce to this Society and every member of the medical profession of this city the high board fences which so effectively inclose our back yards. Were it within my power I would not stop with my introduction here, but would present them with all the eloquence at my command to every society, every profession and every creed in this city that is working for the good of humanity, and to every officer under this municipality, and especially to the Honorable Commissioners of the District of Columbia and all its commissions and boards pertaining to hygiene and public health, to bring about a much needed reform in our city back yards.

There are so many standpoints and so many fences I scarcely know where to attack them.

Perhaps it would be best to tell you of them from my way of seeing them. From the Building Inspector I learned that there are 60,000 inclosures in Washington, and that a fair and conservative estimate would show 1,000 feet of lumber in each of these back-yard fences. Most of these fences decay in from three to five years, and complete destruction is certain in less than ten years. Thus we find 600,000,000 feet of cheap pine lumber (a vegetable matter) constantly decaying.

*Read before the Medical Society December 8, 1908.

Just to give you an idea what these figures mean, I have some estimates showing what this lumber will build. This 600,000,000 feet of lumber will build a board fence seven feet high, 85,714,286 feet long, which equals 16,234 miles; or build a board fence twenty feet high, 300,000,000 feet long, which equals 5,681 miles.

Again, this 600,000,000 feet of lumber will build a twenty-foot fence around the District of Columbia three times and have enough to cover one-fifth of its area. It will floor and roof the District of Columbia, or it will cover 13,774 acres of land. Southern pine forests yield about 6,000 square feet per acre, and it would require 100,000 acres of forest to yield this first crop of back-yard fences, without an estimate for out houses, steps, etc. Then think of the decay and destruction of trees and laps and young growths over this 100,000 acres of forest land during the production of this lumber.

Should I go a step farther, and show you that in one allotted life it will be necessary to build or rebuild these fences seven times, and that it would take 42,000,000,000 feet of lumber? Do these figures surprise you? One quarter of this amount is not an extravagant estimate for sheds and stables with wooden floors, chicken houses, planked closets, back steps, dog houses, etc., making 5,500,000,000 feet of this decaying wood in our city during a period of three score years and ten.

Many of these fences are tongued and grooved and are built close and tight to the ground. They range from six to ten feet high and are all sizes, from a few feet to a large inclosure. Many inclosures such as I show you are about fourteen to twenty feet wide and from four to fifty feet long. The smaller ones are typical dry goods-box style, and are most effective in excluding sunshine and fresh air, and are the hottest places on hot summer days that can be found. Their linings are poorly nourished, weeds and grass with the embanked trash, sweepings, garbage and all manner of refuse that can possibly be accumulated.

Many of these yards are actually filled for a foot or more with years' accumulations, and are so shaded that in places there is scanty or no healthy vegetable growth, only long, straggling grass can be produced; but there is a luxuriant growth of beautiful green moss and mold covering the ground near the fence and extending for a few feet up the damp, rotten boards. Vegetables

cannot grow here and produce, but our young and helpless children have to grow here. We know not yet what microorganisms are developed here, but we can see the nasty carrion-carrying rats dragging the rotten refuse from garbage cans and depositing it in holes in and under the wooden sheds and fences, while the overfed cats sleep thereon, enabling them to make a vigorous serenade during the peaceful hours of our rest. The other inhabitants of these death-breeding sweat boxes are the gentle ones of the home, and the hand that rocks the cradle of our future generations. Here is where she toils her life away with her tender offspring around her. Should she be poor, she stands this burden ; should she be possessed of enough of this world's goods and have her work performed for her, she spends her time gazing upon this degrading picture, while her children and servants are out battling with death-producing bacteria. If conquered by them, they bring sickness to the home either in the kitchen or in the nursery. The poorer the family, the larger the number of children, the higher the fences and the greater the mold and decay to stunt their growth, dwarf their minds and blight the brightness of their character.

These unsightly airtight barricades are demoralizing from every standpoint of honest, open, exemplary life. They discountenance honest labor by hiding the laborer, put a premium on laziness by covering up the neglected, encourage slovenliness by the children half dressed, and encourage crime by the protection offered the criminal. Health inspectors and other officials of the city government are neglectful of their duties, because all these things are hidden from the passerby as he journeys through these alleys. The atmosphere of our 60,000 enclosures is so vile that the children are forced to play on the front four-foot parking, which naturally puts them in the streets to breathe infected dust of sweepers, brave the dangers of the whirling automobile, as well as retard business traffic. Think of the lives lost each year, of these little innocent, growing pleasure seekers, think of the anxiety felt by the mothers when they realize that it is necessary for their children to have fresh air to prevent tuberculosis on the one hand, while on the other hand is the danger besetting the youngster should she leave them out in the street to the mercy of careless drivers.

Within this great city we have a large hospital patronage, an

immense insane asylum, well filled, a large and crowded work-house and a big jail overflowing. Can we ascertain the cause of all this in this glorious free country of ours? The brightness of the sun, the purity of the rain, the freshness of our air is surely health producing in this clean, beautiful city of ours, and still we can not stamp out our typhoid fever, scarlet fever, diphtheria, tuberculosis, etc.

In our search for death-producing bacteria have we examined the soil and decaying vegetable matter in these back yards? What do you think would be the title of a book that would contain the microorganisms and their cultures? Should the government scientists devote only one year's work in this direction? Do you believe there are bacteria known to our profession that would not be isolated? From the views I have presented you, and from your personal knowledge, I believe you all agree in condemning the filth we have so near our homes. Other cities are suffering like our own. If such evils do exist, will it not be the best method of combatting bacterial disease by removing the media in which they exist and their producing beds?

It is natural to believe that bacterial and other diseases would diminish one-half to one-third were our back yards clean. In proportion the area of light and sunshine, our most effectual germicide, it would not only diminish crime, but would improve the health of the city by the removal of these veils of wood, or forts of brick and mortar.

Dr. Needham, President of George Washington University, once said that to produce the most perfect characters in our children it was necessary to surround them with beautiful sights as well as thoughts and words. That the money spent in building beautiful roads, walks, houses and landscapes was as helpful as that for music, art or literature, and he grew eloquent as he unfolded before us some of the beauties of this "Great National Capital." We all know the importance of early impressions upon a child's life, and to build a character of highest type we should start with the infant; to surround its life with beautiful things and in a pretty, clear atmosphere, with lovely flowers, beautiful lawn and God's pure air and sunshine should be our first effort.

For these evils I have a remedy, namely: no back-yard fences at all, but should there be a demand for some protection, for an enclosure, it should be of iron or wire. These do not

decay with foul odor and slimy moss. Iron rust is not unhealthy; properly constructed, an iron fence is strong and durable, hides no criminal, covers up no filth, shuts out but a thread of sunshine, leaves an abundance of space for free circulation of air, and prevents eddies of dead and foul air, all of which stimulate the growth of a vigorous and healthy vegetation.

The worker breathes good oxygen, such open work lifts the idea of shame or disgrace from honest toil, let it be ever so humble. Open rivalry will enthuse the lazy, and self-respect will spur up the untidy lounger to a healthy zeal. A beautiful, clear lawn or open back yard, with such protection, will be a blessing to those who are compelled to labor and spend their time in the back of the house. The sight would cheer our sick and would invite the children from the streets, which would relieve the anxious and overworked mothers.

The children would play and work as they watch the seed unfold the germ of plant life. What lessons from all nature would be revealed to them as the buds open into flowers or produce a vegetable, when compared with the driver on the front punishing his horse, the arrest of a drunken and disorderly culprit, or the so often unsightly accident to a little playmate? Again, the public playgrounds would not be such a burning necessity, now maintained at great public expense.

An iron fence, when compared with wood, is about double the expense for the first production. The one at Soldiers' Home is a heavy and high one. It cost about three dollars and twenty-five cents ($3.25) per running foot. It has a concrete base for its posts; so should all iron and wire fences. A good iron fence seven feet high, answering all demands for a fence, will cost about one dollar and sixty cents per running foot. Its posts are $1\frac{1}{4}$ inches, crossbars $1\frac{1}{2}$ inches, and uprights or rods are $\frac{5}{8}$ inch. Ordinary board fence costs about eighty cents per foot, chicken-wire fence from forty to sixty cents, according to wire; picket-paling fence about twenty-five to thirty cents per foot. A board fence of fifty feet would cost $40 and in an allotted life require to be rebuilt seven times, which would cost $280—always unhealthy and looks ugly; while an iron fence would cost $82.50, a little paint occasionally would make it last a hundred years, with all the requisites of health and happiness. Such yards would present something on the order of these pictures [pictures shown] and

could be lawns [pictures shown], or even converted into a profitable garden [pictures shown] of nasturtiums and tomatoes, raised in this city by a patient; they could not possibly have grown in foul eddies of dead air, with no sunshine.

In conclusion I want to make an appeal to the Commissioners and their Building Inspector that all fences shall be of iron or wire, with iron posts and concrete base; all back steps of same material; walks of concrete; and that all out-houses and sheds be built of iron sheeting, brick, stone, terra cotta or concrete, and that each shed or out-house be detached.

When all these back fences have been removed the bacteria will no longer thrive, the rats will make their home in the sewer, the disturbing serenading cats will be fewer, and the home of the criminal will be converted into a bower of roses where love and happiness prevail.

**Dr. W. C. Woodward** said that he was in full sympathy with Dr. Atkinson's desire for clean back yards; the illustrations shown by him were indicative of bad conditions, but the back yards selected were far from being the worst. Much needs to be done to remedy the insanitary condition of yards and many sanitary inspectors are necessary to secure best results. The high board fences undoubtedly favor the development of slovenly habits in the keeping of back yards, and are a deterrent to good inspection, but much public education would be necessary to induce the people to forego the privacy afforded by the tight back fence.

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A MEMBER of the faculty of the Columbian Medical College at Washington is particularly fond of taking his students unaware in his "quizzes." To one student, whom it would not be uncharitable to call a dullard, the professor said one day:

"What is the dose of oleum tiglii (croton oil)?"

"A teaspoonful," was the answer.

The instructor made no comment; and the student soon realized that he had made a mistake. After fifteen minutes had elapsed, he said:

"Professor, I should like to change my answer to that question."

"I am afraid it's too late, Mr. Blank; your patient has been dead fourteen minutes."—Exchange.

# INGUINAL HERNIA IN CHILDREN, WITH A REPORT OF FORTY-ONE OPERATIONS.*

[Abstract.]

By J. R. WELLINGTON, M. D.,

Washington, D. C.

It is estimated that one in every twenty or thirty persons has a "rupture" at some period of life and that one seventh of these occur during the first year of life. It is three times more common in males than in females, but in children the disparity between the two sexes is much greater.

The congenital form implies the non-closure of the vaginal process, even though the rupture may not actually occur until long after birth. The frequency with which this failure of closure exists is variously estimated from 35 to 65 per cent.

The situation of the internal ring, almost directly behind the external in infants, is undoubtedly an important factor in the development of hernia.

The fact that some children have herina and others with the same defective anatomical condition do not, is probably due to a difference in intra-abdominal pressure. Thus we will find that gastro-enteritis, constipation, diarrhea, intestinal fermentation and other conditions which tend to produce abdominal distension and consequent pressure are the most important exciting causes. Frequent crying, bronchitis, whooping cough, etc., act in the same way. The diagnosis is usually not difficult.

The most serious complication is strangulation, which occurs much more frequently during the first two years of life than later.

The preventive treatment of hernia in infants consists in removing the exciting causes already mentioned as far as possible.

Of the hernia itself the treatment may be either palliative or radical.

The palliative consists in the application of a truss, which will undoubtedly cure a large majority, but in quite a large percentage of those supposed to be cured a recurrence will take place later in life. The earlier the truss is applied the quicker and more certain is the cure.

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* Read before the Medical Society, December 2, 1908.

The truss treatment is contra-indicated at all ages: 1. When a well-fitting truss fails to retain the hernia. 2. When there is an associated hydrocele. 3. When the hernia is strangulated or has been strangulated and reduced. 4. When for financial or other reasons the truss treatment cannot be carried out. 5. Where the treatment continued for one or two years has failed to cure. A much earlier operative treatment than formerly is now advocated, particularly in England, where many surgeons advise operation during the first year of life.

The operation in young children is more difficult than in adults, as the field of operation is smaller and the sac is very thin and with more difficulty separated from the cord. The vas deferens is very small, and great care is necessary to prevent its injury.

The Bassini operation is that usually employed. The after treatment is sometimes difficult in order to prevent the soiling of the dressing and consequent infection. This can be done by placing the child upon a Bradford frame, a finger cot with the closed end cut off is then fastened over the penis with adhesive plaster and the other end fastened to a long rubber tube connecting with a urinal.

A recurrence does not take place in more than 2 per cent. of the cases, and when it does it is usually within the first 6 months.

I have the notes of forty-one cases operated upon by me during the last 2½ years, all except one being at the Children's Hospital. The forty-one operations were upon thirty-six patients, five of whom had the double operation. The anesthetic used in all cases was ether. There were no deaths. The Bassini operation was used in nearly every case. There were only two females in the series.

The oldest case was 12 years and the youngest 11 months, the hernia in this last being strangulated. The youngest uncomplicated case was 2 years of age. About half were 4 years or under. In 20 per cent. it was stated that the rupture was noticed at birth, while in 66⅔ per cent. within the first two years of life. Of the single cases, in 62 per cent. it was the right side. Following operation in most cases there was a slight rise of temperature which quickly subsided. There was no infection except an occasional stitch abscess. The average stay in the hospital was 25 days. In six of the cases there was strangulation; none of these

cases was over 2 years of age. In no case was the bowel gangrenous. In two of the strangulated cases, operated upon on the same day, one contained the cecum and appendix and the other the right ovary.

As to the ultimate results, no case has been brought to our attention with a recurrence. We are able to locate only twenty of these patients. Of these fifteen had been operated upon over 6 months and eleven over 1 year. In no case had there been a recurrence. Five of the cases had developed a hernia on the side opposite to that originally operated upon.

I am aware these cases have been too few to make any positive deductions, yet I feel justified in saying that the operation for inguinal hernia in children is fraught with very little danger, is uniformly free from annoying complications, and the ultimate results are eminently satisfactory.

**Dr. Shands** expressed his appreciation of the paper; it had been especially interesting to him because he had been a resident in the Hospital for Ruptured and Crippled during the time that Bull and Coley were doing the first one hundred of their series of cases. His first paper before this Society, fifteen years ago, was upon this subject, and he had been severely criticised by a prominent surgeon for claiming to have cured ten cases of hernia by the Bassini method when only two years had elapsed after operation. Recently he has observed a number of adults who were operated on for hernia and at the time presented no evidence of hernia on the opposite side; rupture did appear later on the opposite side with no recurrence at the site of operation. He has seldom failed to cure hernia in children under three years by the use of a properly fitting truss; if proper care could be secured, the percentage of cures should be about 95. The truss should be worn without intermission, even when the child is in the tub. A fair proportion of cures may be effected by the use of the truss up to ten years of age if the ring is not too large. The most important feature of the Bassini operation is to ligate the sac very high up, otherwise a short canal or dimple is left to tempt the descent of a new hernia. In children it does not make much difference where the cord is put. Coley has made very little change in his technic during the past fifteen years. Dr. Shand's own practice is to close the wound with a collodion dressing and apply a plaster spica; there is little danger of infection with this method. The spica may be removed at the end of one week; the patient may be allowed out of bed in eight days; may go home in ten days and return to school at the end of two weeks. There is no

reason for children carrying hernia when the operation is so satisfactory and safe.

**Dr. Balloch** had listended to the paper with interest. He thought no one had laid sufficient stress upon the amount of disability caused by hernia. Among hospital cases and ordinary persons in general, nobody will take the trouble to use a truss properly, and operation should usually be preferred. If a truss is to do good it must be constantly worn. He uses a simple collodion dressing, and had not found the plaster spica necessary; Dr. Wellington's method to prevent soiling of dressings was very ingenious. The paper was a timely one; the statistics plainly show the safety of the operation and give ample basis for the statements made.

**Dr. R. L. Cook** related his personal experience of the cure of a hernia by the use of a truss at the age of 19 years.

**Dr. Jack** did not believe the use of a truss should be continued if the patient's consent to operation could be secured. He had found that if the incision is made high up, the simple collodion dressing affords ample protection.

**Dr. Snyder** could see no advantage nor necessity of transplanting the cord in children, as required by the Bassini operation; his practice is simply to draw the columns gently together, and he prefers the use of rather fine catgut for this purpose to kangaroo tendon. He opposed the use of trusses on the ground that they act in the manner of a reamer on the outside, simulating the pressure exerted by the hernial sac from the inside, and thus favoring the enlargement of the ring.

**Dr. L. H. Taylor** agreed with Dr. Snyder as regards trusses, and thought it almost impossible to get a truss to properly fit children. An unfortunate effect of truss wearing is pressure atrophy of the tissues; it is extremely difficult to find adequate structures to effect a cure in such cases when operation finally becomes necessary. His own opinion in regard to the subsequent appearance of hernia on the opposite side in operated individuals is that there is a symmetrical tendency to hernia in such persons.

**Dr. Pool** remarked that the statement had been that 80, 90, or even 95 per cent. of hernia cases could be cured by the use of the truss; other statements led to the conclusion that the truss was useless or harmful; what percentage of cases, on this basis, would get well without treatment?

**Dr. Wellington** said there could be no doubt that a very large proportion of the cases in children can be cured by the use of the truss; just what percentage he did not pretend to say. He had found the plaster spica in very young children difficult to keep clean, and had given up using it. He thought a week too short a time to keep these patients in bed. As to the importance of transplanting the cord, the figures of Bull and Coley on this point were significant. He had not found any trouble result from the use of kangaroo tendon in these cases.

## PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

**Wednesday, November 4, 1908.**—The President, Dr. H. D. Fry, presided; about 50 members present.

The Treasurer reported for the month of October: Receipts, $702.50; disbursements, $76. The following appropriations were granted: For printing 500 blank receipts for Treasurer, $2.25; for engraving half tones for History, $24.

The Treasurer read a letter from Dr. J. Dudley Morgan transmitting the amount of his assessment for publication of the History and making the offer of a further subscription of $25.00, if needed, for the successful completion of the work. The Treasurer read the letter in order to express his appreciation of it.

Dr. Motter explained a circular letter that had been sent out under the authority of the American Medical Association Pharmaceutical Committee to all medical societies entitled to representation in the convention, asking for the delegation of representatives to the convention and also for participation in certain preliminary considerations, detailed in the letter in question. Such a letter had been sent to the Medical *Association* of the District of Columbia under a misapprehension; as that body is not entitled to representation in the convention, not being incorporated, the communication should have been, and has since been, sent to the Medical *Society*. The Corresponding Secretary presented the letter referred to by Dr. Motter, and it was referred to the Executive Committee for consideration and report.

At the request of Dr. D. G. Lewis, an address by Rudyard Kipling upon the medical profession was read.

Drs. Barton and Hamilton reported a case of Staphylococcus Cystitis, due to staph. albus and citreus. Discussed by Drs. Kinyoun, Hamilton, A. F. A. King, Littlepage, Carr, Roy and Fry. See p. 439.

Dr. Wellington reported a case of Tubercular Obstruction of the Intestine, and presented the specimen. Discussed by Drs. Balloch and I. S. Stone. See p. 436.

Dr. Llewellyn Eliot read the paper for the evening. Subject: "Journalistic Suggestions for Medical Writers." Discussed by Drs. A. F. A. King, D. S. Lamb, I. S. Stone and Williams. See p. 413.

**Wednesday, November 11.**—The President, Dr. Fry, presided; about 70 members present.

Dr. McLaughlin read a paper entitled: "Eczema in Children." Discussed by Drs. T. C. Smith, S. S. Adams, Carr, Kober, Acker and McLaughlin. See p. 420.

Dr. D. S. Lamb read a paper entitled: "Gallstones; Analysis of Sixty-one Cases." Discussed by Drs. I. S. Stone, Vaughan, Kober, Macatee, G. Brown Miller and D. S. Lamb. See p. 429.

**Wednesday, November 18.**—The President, Dr. Fry, presided; about 106 members present.

Dr. Nichols read an essay entitled: "Partial Myxedema." Discussed by Drs. J. D. Morgan, Williams, P. C. Hunt, Fremont-Smith, Reyburn, I. H. Lamb, Acker and Nichols. See p. 457.

Dr. Vaughan read a "Review of Surgery." Discussed by Drs. Balloch and E. L. Morgan. See p. 451.

**Wednesday, November 25.**—The President, Dr. Fry, presided; about 75 members present.

Dr. Nicolas Achucarro was elected a member by invitation.

Dr. John D. Thomas read the essay for the evening. Subject: "Typhoid Perforations." Discussed by Drs. J. F. Mitchell, Claytor, Vaughan, S. Ruffin, Wellington, J. D. Morgan, Fremont-Smith, Balloch, Van Rensselaer, A. F. A. King, Chappell, Randolph, Macatee and Thomas.

Dr. D. S. Lamb presented specimens of Typhoid Perforations.

Dr. Randolph presented a patient with Asthma, Valvular Disease of the Heart and Pulmonary Tuberculosis. After a recess to examine this patient, the case was discussed by Drs. S. Ruffin and J. D. Thomas.

**Wednesday, December 2.**—The President, Dr. Fry, presided; about 75 members present.

The resignation of Dr. Richard W. Blackburn from active membership was presented and accepted.

On motion of Dr. McLaughlin the following resolution was adopted:

"WHEREAS the members of the Medical Society of the District of Columbia desiring to show their appreciation of the valuable services rendered by the members of the Historical Committee, by extending to them an invitation to be present at a complimentary smoker to be given at Rauscher's; therefore be it *Resolved* that a committee of three be appointed to coöperate with the Committee on Entertainment and make the necessary arrangements."

Dr. G. W. Stiles was elected a member by invitation.

Dr. Williams presented patients to demonstrate the Differentiation between Functional and Organic Spasms. Discussed by Drs. Chappell, Wm. A. White and Williams.

Dr. Hagner reported a case of Solitary Kidney and presented the specimen. Discussed by Drs. G. Brown Miller and Hagner.

Dr. Wellington read a paper entitled "Inguinal Hernia in Children," with report of forty-one cases treated by operation. Discussed by Drs. Shands, Balloch, R. L. Cook, Jack, Snyder, Reichelderfer, Taylor, Pool and Wellington. See p. 476.

**Wednesday, December 9.**—The President, Dr. Fry, presided.

Dr. G. Wythe Cook offered the following resolution:

"WHEREAS, in the enactment of the Medical Practice Law a large part of the Charter of the Medical Society of the District of Columbia was necessarily repealed, and WHEREAS, The Medical Association of the District of Columbia and the Medical Society of the District of Columbia are made up of practically the same individuals, and there is no longer any good reason for their separate existence; therefore be it *Resolved* by this Society that its Executive Committee be instructed to consider what changes are necessary to be made in its Charter so that the two bodies may be united into one organization and to report their conclusions to the Society without delay. *Resolved* that the Medical Association of the District of Columbia be requested to appoint a committee to meet a like committee to be appointed from this Society to consider the desirability of uniting the two bodies."

On motion of Dr. Chappell the resolution was adopted.

For the information of members, Dr. P. C. Hunt called attention to the introduction into Congress of a bill providing for the commitment of alleged lunatics to the Asylum, which bill stipulated that the fee for the medical witness' examination and testimony shall be $5.00.

Dr. Carr reported a case of Aneurysm of the Thoracic Aorta, and presented the specimen.

Dr. Atkinson read a paper entitled "A Plea for Clean Back Yards," but asked permission to modify the title to "The Relation of High Board Fences to Dirty Back Yards." See p. 470.

Dr. L. Eliot read a paper entitled: "Smallpox as I Have Seen It in the District of Columbia." Discussed by Dr. Woodward.

**Wednesday, December 16.**—Dr. Fry, the President, presided; about 125 members and others present.

The Chair appointed Drs. Prentiss Wilson, R. D. Adams and Glenn I. Jones a committee to prepare and report suitable resolutions of respect to the memory of the late Dr. W. E. Rogers.

The following assignments for reviews and essays during the next session were made:

| *Reviewer.* | *Subject.* | *Month.* | *Essayist.* |
|---|---|---|---|
| Sterling Ruffin, | Internal Medicine, | January, | W. M. Barton. |
| A. F. A. King, | Obstetrics, | February, | M. G. Motter. |
| J. S. Wall, | Physiology, | March, | G. W. Cook. |
| G. M. Kober, | Hygiene and Sanitary Science, | April, | S. S. Adams. |
| N. P. Barnes, | Therapeutics, | May, | J. T. Kelly. |
| W. G. Erving, | Orthopedics, | October, | Mary Parsons. |
| E. A. Balloch, | Surgery, | November, | T. A. Claytor. |
| W. A. Wells, | Otology, | December, | L. W. Glazebrook. |

Dr. Mackall, Chairman of the Executive Committee, said that the Committee had a report to make, but that, as a number of

matters had been considered, he asked leave to defer the report to a later meeting. The matter of the proposed amalgamation of the Medical Society and Medical Association had been referred to a special committee, which committee was still in existence; he therefore asked that Dr. Cook's resolution, adopted at the last meeting, be referred to that committee.

Dr. Cook said that he was not aware that the subject-matter of his resolution had so lately been before the Society; he moved that the Executive Committee be relieved from the consideration of the resolution presented by him and that the matter be laid on the table. The motion was carried.

The Vice President, Dr. J. T. Kelly, took the chair, and the President read an address entitled "Random Thoughts About Life and Doctors." See p. 460.


# WASHINGTON MEDICAL ANNALS.

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EDITORIAL COMMITTEE.

D. S. Lamb, A. M., M. D., *Chairman*, . 2114 Eighteenth Street, N. W.
Chas. S. White, M. D., . . . . . The Farragut.


## Editorial.

The XVIth International Medical Congress.—Secretary-General, Professor Emil Grósz, M. D.—Office, Budapest, VIII, Esterházy-uteza 7.—In accordance with the resolution passed at Lisbon on the 26th April, 1906, the XVIth International Medical Congress will be held at Budapest from the 29th August till the 4th September, 1909, inclusive.

Dr. F. E. Maxcy, a member of this Society, died at his residence, 1118 Rhode Island Avenue, December 25, 1908.

Dr. Charles Allen, for many years a member of the Society, but who afterwards practiced homeopathically, died December 24, 1908.

## Exchanges.

*Annals Gynecology and Pediatry.*
*Buffalo Medical Journal.*
*Colorado Medicine.*
*Cronica Medica Mexicana.*
*Journal Kansas Medical Society.*
*Journal Medical Society New Jersey.*
*Journal Michigan Medical Society.*
*Louisville Monthly Journal Medicine and Surgery.*
*Maryland Medical Journal.*
*Modern Medicine.*
*New York State Journal Medicine.*
*Northwest Medicine.*
*Old Dominion Journal.*
*Pacific Medical Journal.*
*Proctologist.*
*Providence Medical Journal.*
*Quarterly Bulletin Northwestern University Medical School.*
*Texas State Journal Medicine.*
*West Virginia Medical Journal.*

## Publications Received.

W. S. Bainbridge, "Irremovable cancer"; reprint.

G. T. Vaughan, "Uncertain results of suturing nerves". "Stone, tuberculosis of kidney and perinephric abscess"; reprints.

"Transactions of Sixth Annual Conference of Health Officers and U. S. Public Health and Marine Hospital Service, April 27, 1908."

U. S. Naval Medical Bulletin, Oct., 1908.

L. H. Adler, "Rectal disease." "Hemorrhoids"; reprints.

G. B. Johnston, "Splenectomy"; reprint.

Leartus Connor, "Ophthalmology for general practitioners"; reprint.

Tom A. Williams, "The so-called gastric neuroses." "The treatment of a case of hysteria." "The French clinics in neurology and psychiatry." "Recent advances regarding hysteria in relation to traumatic neuroses"; reprints.

Bureau of Public Health and Marine-Hospital Service.—A board of commissioned medical officers will meet at the Bureau, 3 B Street, S. E., Washington, D. C., Monday, January 11, 1909, at 10 o'clock A. M., for the purpose of examining candidates for admission to the grade of assistant surgeon in the Public Health and Marine-Hospital Service. For further information, or for invitation to appear before the board of examiners, address "Surgeon-General, Public Health and Marine-Hospital Service, Washington, D. C.

## Medical Miscellany.

**The Edward N. Gibbs Memorial Prize, $1,000.00.**—Subject: The Etiology, Pathology and Treatment of the Diseases of the Kidney.—The New York Academy of Medicine announces that the sum of $1,000.00 will be awarded to the author of the best essay in competition for the above mentioned prize. Essays must be presented on or before October first, 1909. The three subjects mentioned in the title need not be treated with uniform fulness, but new discoveries or fruitful research will be considered the standard of merit. Each essay must be in English, typewritten, designated by a motto or device, and accompanied by a sealed envelope bearing the same motto or device, which shall contain the name and address of the author. No envelope will be opened except that which accompanies the successful essay. The Academy reserves the right, according to the direction of the donors, not to award the prize if no essay shall be deemed worthy of it. The Academy will return the unsuccessful essays, if claimed by their respective authors, or by authorized agents, within six months. An essay must show originality in order to obtain the prize. The competition is open to members of the regular medical profession of the United States. The successful essay shall be the property of the Academy, and, according to the deed of gift, will be published in its Transactions. Essays should be transmitted to the "Committee of the New York Academy of Medicine on the Edward N. Gibbs Memorial Prize."

**Samuel D. Gross Prize, $1,500.00.**—This prize is awarded every five years for the best original essay not exceeding 150 printed pages octavo, on some subject in surgical pathology or surgical practice founded on original investigations. Candidates must be American citizens. The successful competitor is re-

quired to publish his essay in book form, deposit one copy in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and on the title page shall state that the essay was awarded the Samuel D. Gross prize of the Philadelphia Academy of Surgery. The essays must be in English, and be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of College of Physicians, 219 South Thirteenth Street, Philadelphia," on or before January 1, 1910. Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. Unsuccessful essays will be returned to the writers if requested by them within one year. The committee, which comprises Drs. W. J. Taylor, R. H. Harte and DeForrest Willard, reserves the right not to make an award if in its opinion none of the essays is worthy.

**The Uncertain Result of Suturing Nerves.**—By Dr. George Tully Vaughan.—Vaughan states that much contradictory evidence exists concerning the results in nerve suture, and there is not a unanimity of opinion regarding the definition or requirements of a good result. Contrary to the general opinion, secondary suture of divided nerves gives just as good results as immediate suture. Nerve grafting is more disappointing.

He reports five cases of nerve suture: I. Division of the median and radial nerves and other structures in the forearm. The nerves were sutured at once. Eight years later the patient had good use and sensation of all the fingers except the index and thumb. The median nerve did not functionate. II. Median nerve severed by gunshot wound. Immediate suture. While the patient obtained good use of the hand in eighteen months, imperfect flexion and extension of the inner fingers and slight flexion of the thumb remained, indicating non-union of the nerves. III. Median nerve and brachial artery partially destroyed by gunshot wound. Suture by flap method. Three years later the result was perfect, as indicated by complete flexion, extension, pronation and supination. IV. Median nerve divided by lacerated wound. Immediate suture. Three years later the result was excellent. V. Saw wound of the axilla, dividing axillary vessels and median, ulnar, musculo-spiral and internal cutaneous nerves. Immediate suture. Gangrene of the hand and portion of the forearm followed, necessitating amputation three inches below the elbow. Enough time has not elapsed to give a fair idea of the result.—C. S. W.

**Alcohol and Digestion.**—Kast [*Archiv. f. Verdau. Krankheit*, Vol. XII, No. 5, see *Modern Medicine*] experimented on dogs after the method of Pawlow, and found that dilute mixtures of alcohol used continuously at first cause hyperchlorhydria, afterwards catarrh; or the acid gradually diminishes.

**Alimentary Poisons a Cause of Atheroma.**—Loeper [see *Arch. des Maladies du Coeur des Vaisseaux et du Sang*, quoted by *Modern Medicine*] found a calcification of the middle coat of the arteries after the use of alimentary poisons; in rabbits, oxalic acid was markedly active in causing atheroma; lime salts also favored it, and also the use of theobromin. Tomatoes, rhubarb, spinach, tea, coffee, cocoa, contain much oxalic acid.

**Transactions of the Sixth Annual Conference of State and Territorial Health Officers, April 27, 1908, published by the U. S. P. H. and Marine-Hospital Service.**—The conference was called to consider interstate quarantine regulations in regard to tuberculosis, typhoid fever, measles, scarlet fever and diphtheria, in addition to those previously provided for by act of Congress, namely, cholera, yellow fever, smallpox and bubonic plague. The conference also considered and approved a bill now in Congress authorizing the Surgeon General of the U. S. P. H. to investigate the prevalence of tuberculosis, typhoid fever, rabies, etc., the conditions influencing their propagation and spread, and methods for prevention and suppression. Finally the question of a National Bureau of Public Health was much discussed.

**U. S. Naval Medical Bulletin, October, 1908.**—This Bulletin contains the following:

1. Peculiar characteristics of a spirochaeta Duttoni, namely, an enlargement. C. S. Butler inclines to consider the spirochaete as not a bacterium but a protozoon. 2. Samoan conjunctivitis; by P. S. Rossiter. He believes it to depend on the micrococcus catarrhalis and to be an acute infection. 3. Composition of potable water; by E. R. Noyes. 4. Elephantiasis of scrotum; by A. M. Fauntleroy; three cases operated on; illustrated by photographs. 5. Simplified Turk's counting chamber; by C. S. Butler. 6. Cases of cerebro-spinal meningitis treated with the Flexner-Jobling serum; by H. F. Hull; Newport, R. I. One case was cured; the other two died later of hydrocephalus. The serum was beneficial in all and did no harm. 7. Four cases of tuberculosis treated by mercurial injections; by R. Hayden. Three were pulmonary, in one the glands were affected. No other drugs were used. Two cases were cured, the other two improved. 8. Four cases of chronic pancreatitis treated by drainage of gallbladder; H. C. Curl and H. W. Smith. 10. Lupus of penis successfully treated with tuberculin by R. S. Langabaugh. 11. H. G. Beyer reviews the subject of the organization of the medical department of the navy for battle. D. G. Allen reports culture from the throat that showed Neisser granular staining characteristics. R. W. King gives a rapid method for determining ammonia in urine; also for the detection of occult blood in feces, urine and the stomach contents. E. R.

Stitt makes a practical use of the latter method in the diagnosis of Blackwater fever. A. Farenholt gives a short account of legislative action regarding the U. S. Naval Medical Corps and of Hospital History.

**The Medico-Legal Aspect of the Absence of Water in the Lungs.**—New York's noted specialist, Dr. A. Brayton Ball, writes the following interesting letter to the *New York Times*:

"Several cases have been reported in the newspapers recently in which the absence of water in the lungs of persons found immersed in ponds and rivers has led to the conclusion that death had occurred before immersion, and that the crime was therefore murder, not suicide. As the matter is of great criminal importance, permit me to call attention briefly to the report, in 1862, of a committee appointed by the Royal Medical and Chirurgical Society of London to investigate this question. It was a well known fact that in most drowned persons water was not found in the lungs, and it was supposed by many that in drowning a spasmodic contraction of the entrance of the windpipe took place which prevented the entrance of water. The committee made a very careful and prolonged investigation and came to conclusions which I summarize as follows:

"First—Water does enter the lungs in drowning. In animals drowned by immersion in water the lungs, if examined immediately afterward, are full of water. If a dog be drowned in plaster of paris the plaster is found in the smallest tubes. In a guinea pig whose nose only has been immersed in mercury the globules of mercury penetrate the finer tubes.

"Second—If the examination be delayed for several hours or longer, as is generally the case, no water may be found in the lungs, absorption having taken place even after death. In experiments upon animals it was found that forty or fifty ounces of water could be introduced into the lungs without any of the liquid being detected there an hour or two afterward. In cases of undoubted drowning in human beings, when the examination is delayed for several hours after death, fragments of water plants and other foreign substances may be found in the windpipe and larger tubes without any water being detected in the tissue of the lungs. Absorption of water takes place in the lungs, even after death, and therefore the absence of water in the lungs many hours after death has no bearing upon the question of murder or suicide. It is very important that this fact should be generally known."—*West Va. Med. Journ.*, Dec., 1908.

**Some of the Things a Man Saw in Delirium Tremens.**—Charles Roman gives a record of his own experience as a victim of delirium tremens. It is a remarkable psychological document, comparing favorably in interest and as a piece of writing with De Quincy's "Confessions of an Opium Eater." Following is a

brief extract which gives some suggestions of the things the patient saw:

"Up to this point the zoölogical visitations had been intermittent. During the next few days, however, I saw all that I could stand. I saw such prehistoric creatures as exist nowhere except in museums. I saw rats as they marched past my door, or flew through my windows or floated in my tub. Elephants strode in and out with lumbering steps and swaying trunks. At times they seated themselves and taunted me with their thunderous bellows or their ear-splitting screechings. They flaunted their snouts high in the air and guffawed. Monkeys jumped from limb to limb in the trees outside my room.

"Snakes of all colors of all descriptions, reptiles with fantastic figures upon their backs, and with eyes of sapphire or ruby or of milk-white marble, wriggled upon the floor or crept in or out of heretofore unseen crevices in the walls and dropped into the water in my tub. They swam around and around me, squirming under me, with their tongues darting in and out with ferocious activity. Lions I heard roaring, and tigers I saw while they opened their mouths like huge cats, in silent, angry disapproval, licking their whiskers and wetting their paws, softly and daintily. This and far more.

"I saw crocodiles in droves. Fat, scaly, glistening beasts they were, with frothy, foaming jaws, long, sweeping tails, crouching upon or creeping along the foot of my bathtub or on my bed, and grinding their yellow teeth in gluttonous anger as they contemplated me, their prey. I saw the reeking, slippery body of a crocodile slide into the water of my tub. Then, as I shrank in breathless horror to escape, I saw his greedy, filmy eyes arise to the surface, with his cold, foul chin flush with mine. His icy beak touched my cheek, the hot vapor from his lungs seared my flesh. I turned as cold as ice and trembled like a leaf in a storm."—*West Va. Med. Journ.*, Dec., 1908.

**Relation of Medical Men to Hospitals.**—Editorial in *American Medicine*, Sept., 1908.

The hospital problem is bound to call, in the near future, for serious attention on the part of thinking medical men. No one can deny that the development of medical eleemosynary institutions has been largely responsible for the progress of medical and surgical science. But coincidental with the growth of the hospital idea, grave dangers to the rank and file of the medical profession have appeared. In most communities, wherever one finds a hospital, there also will one find a small *clique* of medical men enjoying special advantages and privileges by virtue of their hospital connection. Their less fortunate and influential colleagues are denied these advantages, and are proportionately handicapped in the practice of their profession. Since to send

patients to such institutions is tantamount to losing their patronage nine times out of every ten, the "outside" practitioner naturally discourages hospital treatment except as a *dernier ressort.* A case, even though a charity one, may be exceedingly interesting and the attending physican may wish to gain all possible experience from its observation and study. If he is not a member of the hospital staff, however, his connection with any case ceases when it enters an institution. All these things tend to defer the well recognized benefits to be derived from hospital regimen, and it is a notable fact that hospital cases are usually advanced—not infrequently too far advanced. Therefore, if hospitals have not fulfilled their most complete function in any community, the reason can usually be found in rules which confer special advantages on a few medical men and rigorously deny any privileges to those outside the "charmed circle."

No reflection is intended on those fortunate medical men who hold hospital appointments. With rare exceptions such men are well chosen, they are capable and honorable, and would scorn to purloin their colleagues' patients. But there are psychologic factors involved in the treatment of a patient in a hospital by a physician or surgeon enjoying the prestige of official appointment, and any patient who passes successfully through the ordeal of a surgical operation or serious illness, is pretty apt to focus his gratitude, regard and confidence on the medical man who attended him. This is natural and involves no wrong, but when the attending physician or surgeon is an active competitor of the colleague who sent the patient to the hospital, to have the patient forsake the old for the new, not only creates a difficult ethical situation, but works a hardship on the original physician. Had the latter had the same opportunity, in all probability he would have equally proven his skill and worthiness.

Another objectionable feature of limited staff appointments is found in the fact that too few men can have access to the opportunities afforded by hospitals for increasing individual proficiency in the technic of diagnosis and treatment. Such a system therefore tends to elevate the few at the expense of the many, whereas the ideal professional situation in any locality is a community of interest with "equal rights for all and special privileges to none." The practice of medicine is not a soulless scramble for wealth and power, but a vocation for earnest men who must constantly and unflaggingly seek the highest possible efficiency in order to do the greatest possible good.

The ideal hospital system, and one that sooner or later must be adopted, is that which offers to every medical man the opportunity of placing his patients in any hospital he or they may elect, there to treat them with all the freedom that is his as a legally qualified practitioner of medicine. No fear need be entertained as to the effect on any hospital's statistics. Talents and skill will

win out, just as they do in private practice, but giving equal hospital privileges to every physician and surgeon cannot fail to work for the general elevation of all. The benefits that will accrue to the afflicted are immeasurable, for instead of being the last resort, a sojourn in a well equipped hospital will be the general custom, especially in the management of infectious or contagious diseases. Hospitals will then become in reality what they were originally intended to be, institutions solely for the use and welfare of the public, and not institutions for the promotion of private gain, professional or otherwise, as under present conditions is too often the case.—*N. Y. Med. Journ.*, Dec., 1908.

## Review of Books.

ARTERIOSCLEROSIS: Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis and Treatment. By LOUIS M. WARFIELD. Saint Louis, Mo., 1908. C. V. MOSBY COMPANY, St. Louis, Mo. Price $2.00.—This work is a quite satisfactory general résumé of the subject of which it treats. The English in places is not impeccable, and there is a tendency to vague generalities and Pharisaisms. The general makeup of the book and the illustrations are attractive.—J. B. N.

GONORRHOEA IN WOMEN. By PALMER FINDLEY, M. D., Professor of Gynecology in the College of Medicine of the University of Nebraska, Omaha, &c. Published by C. V. MOSBY MED. BOOK AND PUB. CO., St. Louis, Mo.—Dr. Findley has evidently recognized the fact that the average textbook must of necessity be altogether too brief to give more than a short statement of the more salient points in regard to a given subject. We find in textbooks the things with which we are familiar, but when we wish to get at unusual facts we musl consult monographs. His monograph contains more than 100 pages, and yet cannot be said to exhaust the subject.

The work begins with a brief historical sketch which is interesting. The chapters on etiology and pathogenesis are complete and scientifically treated. The chapter on pathology might call for a division of opinion. The statement that "*In the chronic stage the walls of the uterus are tkickened even to double their normal dimensions. There is an increase in the firmness of the texture and a loss of normal elasticity. This is due to an increase in connective tissue at the expense of the musculature*" will hardly meet the approval of those who regard the gonococcus as largely incapable of penetrating the uterine walls and essentially an infector of mucous membrane.

The quoted statement of Jullien that in 8 per cent. of cases of gonorrhoea in women the rectum is involved, and of Baer that 35 per cent. of cases had rectal or anal involvement, are interesting, but must be confirmed before they can be accepted. One might get the idea that gonorrhoeal cystitis is of extremely rare occurrence, which is not the case. The author has quoted extensively from prominent writers upon the subject.

The book, taken as a whole, is most worthy of commendation, and is well worth a careful perusal. It is quite free from typographical errors, the only one noted being on page 98, "The Painful *Heal* of Gonorrhoea." It is nicely printed and bound. Price $2.00.—G. B. M.

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